

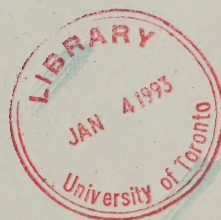
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Report Prepared for the Research Division
Royal Commission on National Passenger Transportation

***The Ownership and Organization of Transportation
Infrastructure—Roads and Airports***

Ron Hirshhorn
August 1992

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Opinions expressed are those of the
author and not necessarily those of
the Royal Commission on National
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**THE OWNERSHIP AND ORGANIZATION
OF TRANSPORTATION INFRASTRUCTURE—
ROADS AND AIRPORTS**


by

RON HIRSHHORN

Helpful comments on an earlier draft were received from Janet Smith, John Sargent, Bill Waters, Tom Byerley and Richard Lake. Responsibility for all statements in the paper rests with author.

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CHAPTER 1 - INTRODUCTION

In Canada, as in many other countries, the traditional reliance on government for the provision of most transportation infrastructure is being questioned. New possibilities for private ownership and operation of infrastructure are being explored. Governments are looking at the potential to contract out various activities, and to transfer management responsibilities to public agencies or independent authorities. In this paper we examine a number of alternative ownership and organizational arrangements for roads and airports. A main focus is on the two main competing alternatives of public and private provision. In the remainder of this chapter, we set out a framework for comparing public and private provision and highlight some relevant general considerations.

A Question of Instrument Choice

For governments, there is an obvious attraction in allowing the private sector to undertake a major project at a time when there is great concern about the budgetary implications of public spending. However, financing considerations provide a questionable basis for privatization. As long as there is no constitutional restriction on deficit financing (as there is, for example, in California), governments can draw on private sector capital markets in the same way as a private infrastructure company. Moreover, borrowing costs tend to be lower for the government than for a private firm whose debt is subject to a higher risk of default.¹

While government investment in new infrastructure will increase the public debt, it may also increase the country's stock of productive assets. A project that is commercially viable and could be left to the private sector, will also generate a positive return for the public sector. The future income stream that attracts private investors is potentially available to the government. In other words, it is misleading to suggest that taxpayers are being relieved of a financial burden when a project is transferred from the public to the private sector.

Another argument for private provision arises out of the expectation that the private sector will perform more efficiently than the public sector. Advocates of this argument draw theoretical support from the property rights literature which emphasizes the superiority of the mechanisms that exist to discipline performance in the private sector. A major point of focus in this literature is on the non-transferability of ownership claims in the public sector. The potential significance of this, as initially cited by Alchian (1961) and elaborated on by De Alessi (1983, p. 68), is that "it rules out specialization in ownership, inhibiting the capitalization of future value consequences into current transfer prices and reducing the incentive of those who bear such consequences to monitor managerial behaviour." Hence, in the private sector, owners have both a greater incentive and a greater capacity to ensure that managers are working diligently on their behalf.²

Implicit in this argument is the assumption that the private sector is fulfilling the same role as the public sector; in other words, comparing public provision of infrastructure with private provision is comparing apples with apples. But, generally the public sector is involved because of the need to pursue certain public policy objectives; government is not simply engaging in commercial production. Since the public infrastructure provider is involved in the production of a more complex output, the finding that principal-agent problems are more difficult and costly to address than in the private sector is not very surprising or very instructive.

Where there are legitimate public policy objectives, the choice between public and private provision becomes a question of instrument choice. In particular: Should the government seek to achieve its objectives by entering into a transaction with the private sector, or should it undertake production itself? This is analogous to the question faced by private firms who must decide whether they will "make or buy" the inputs they require. As in the case of a private firm, the government will be attracted to the "buy" option if others can produce the desired output more efficiently, and it can extract the rents associated with the increased efficiency. From this perspective, the relevant comparison is not between principal-agent problems in the public and private sectors, but rather between the transactions costs the government faces if it contracts with a private firm and if it produces in-house.

There are various reasons why governments may not wish to leave the provision of infrastructure entirely to the market. One major concern is that infrastructure owners will have monopoly powers, enabling them to charge prices and earn profits that are higher than justified in terms of either efficiency or equity. The relevant question, then, is whether this policy concern is best addressed through public production or through a contractual arrangement with a private firm.

Contracting Problems

Sappington and Stiglitz (1988) have identified certain conditions under which an auction system in which private firms bid for the right to provide a good or service yields optimal results. Under this scenario there can be no advantages to public production; private firms will produce precisely what the government wants at minimal cost and without earning excess profits. While the ideal auction is a fictional paradigm, conditions are sufficiently close to the ideal in some situations that governments can partake of the benefits of competitive contracting. Evidence gathered in a number of countries suggests that competitive contracting substantially reduces the costs of providing local services such as urban bus transit, refuse collection, cleaning services, debt collection, park maintenance and street repair.³ In the case of urban transit, for example, Wendell Cox and Jean Love (1991) have estimated that, in the U.S., the shift from public to private production has resulted in cost savings averaging 30 percent. While the lower costs of private provision partly reflect wage differentials, there is ample evidence of organizational and technological improvements that involve genuine gains in efficiency.

Evidence on the benefits of contracting out comes from transactions with some important common characteristics: public policy objectives were clear; it was possible for the government to develop reliable indicators of performance; the desired services could be purchased from competitive suppliers; and it was possible to limit the duration of the contract - almost all contracts being under five years. These characteristics do not apply to road and airport services.

A distinguishing feature of such infrastructure is that it entails a major investment in durable, highly specialized physical assets. Williamson (1975, 1981) has elaborated at length on the problems associated with transactions involving such investments. Short-term contracting is not possible given the long-term nature of the commitments that are required. While competitive bidding is possible at the time of the original agreement, the parties thereafter become "locked in", and the trading environment becomes transformed into a situation of bilateral monopoly. The parties will have an incentive to act opportunistically to increase their gains from trade. While these problems are greater with complex agreements that are subject to a high degree of uncertainty, they are a feature of all long-term contracts. Such agreements are necessarily incomplete since it is not possible (given "bounded rationality") to take account of all future contingencies and expressly provide for required adaptations in the original agreement.⁴

According to Williamson, firms will opt "to make" rather than "to buy" to economize on transactions cost in such circumstances; "asset specificity," which includes specialized investment but can also take the form of a specialized site or a specialized set of skills, is a main reason why firms vertically integrate. Empirical tests by, for example, Eccles (1981), Monteverde and Teece (1982), Masten (1984), and Globerman and Schwindt (1986) lend support to the importance of transactions costs as a determinant of organizational arrangements in the private sector.

In comparing the contracting out of infrastructure provision with the contracting out of activities such as urban transit, it is also necessary to consider possible differences in the nature of public policy objectives. Local governments have not had major problems in specifying public policy objectives for urban transit. But in other areas where public policy objectives are unclear, or are dependent on economic or social circumstances, it would be difficult for government to specify its requirements with the precision required to enter into a contractual arrangement. For example, provincial electric utilities such as Ontario Hydro have traditionally been used as instruments of economic development and macroeconomic stabilization.⁵ These types of public policy objectives are situational and do not lend themselves to clear specification. This problem is exacerbated by the need, in the case of electric utilities as in the case of roads and airports, for a long-term contractual arrangement. A contract for urban transit services can be renegotiated at the end of three to five years to take account of new conditions and changes in public policy objectives. With roads, airports and electric utilities, the contract term to which governments must commit themselves is more likely to be in the order of 50 years.

Implications for Instruments Involving Contractual Arrangement with Private Sector Firms

As we noted, one reason - though not the only one - for government intervention in infrastructure activities is to limit the potential for monopoly abuses. Where governments have chosen to control monopoly power through some form of contractual arrangement with a private firm, rather than through public provision, there are two approaches that have been adopted: a franchise has been awarded to a private firm; a private monopolist has been allowed to operate subject to government regulation. These two options are subject, to some degree, to the sorts of contractual problems discussed above.

A Monopoly Franchise

Under this arrangement, the state enters into an explicit contract with a private producer who agrees to provide a specified quantity and quality of output for an agreed-upon amount of compensation. With a successful franchise arrangement many of the benefits of competition are retained; competition within a market is effectively replaced by competition for the award of the franchise. But while franchise arrangements have worked well for services such as urban transit, they have been much more problematic where the requirement for large amounts of durable specialized capital has necessitated a long-term agreement. The long-term contracting problems that Williamson has identified were much in evidence in the late nineteenth and early decades of the twentieth century when governments entered into agreements with private firms for the supply and distribution of electricity and natural gas.⁶

In a much-cited article, Demsetz (1968) has suggested that limited-term franchises could be awarded for the provision of utility services. The intention is to realize the benefits of competitive tendering, while avoiding the transactions costs of incomplete long-term contracts that must be adjusted over time. But, if there is to be competition when a franchise for an activity involving sunk capital comes up for renewal, there must be an effective system in place to transfer assets from the incumbent firm to the winning bidder. As Williamson (1976) has shown, this is very difficult to achieve. The costs of bargaining for the asset transfer could, in themselves, be such as to discourage a competitive challenge to the incumbent. Uncertainty about the price at which assets will be transferred can discourage bidding for the initial franchise and distort investment decisions.

Even if the problem of transferring assets could be successfully addressed, this would not ensure competitive conditions at the contract renewal stage. The learning that has occurred in the process of operating a facility could provide the incumbent with an important advantage over new bidders. This advantage could translate into lower costs of operation. It may also put the incumbent in a better position than other firms to determine what constitutes a reasonable bid for the franchise. While the information advantage of incumbents can also be a problem when short-term contracts come up for renewal, it is a particular concern when the transfer of large, complex facilities is at issue.

An alternative to Demsetz's approach is to have the government own the utility and to limit the scope of the private franchise to the operation of the facility. This avoids the problems that arise in transferring the ownership of assets, although it also means that the potential gains from the action of competitive forces are restricted to operating, as distinct from investment, decisions. There would continue to be the problem of ensuring that the information advantages of the incumbent do not prevent effective competition at the contract renewal stage. In addition, there would be a need for careful monitoring to ensure that the private operator does not attempt to increase his own profits through the more rapid depreciation of publicly-owned assets.

Government Regulation

Under government regulation, an independent body, the regulatory agency, is handed the task of administering an implicit contract between the state and owners of private capital.⁷ The implicit contract pertains to basic principles, including the right of the private owners to a fair rate of return and their obligation to provide consumers with a satisfactory level of service. Important specifics, including product prices and the allowed rate of return to private investors, are decided at periodic regulatory hearings.

A regulatory regime constitutes a highly flexible long-term contractual arrangement. It incorporates a procedure whereby adjustments can be made to take account of changed economic circumstances and unforeseen contingencies. The regulatory process is an effective mechanism for resolving disputes over the obligations of the parties. Moreover, the auditing procedures of the agency along with the regulatory hearing process reduce the ability of the parties to extract gains from opportunistic behaviour. The result, as Baldwin (1989) notes, is that regulation is an effective alternative to public production for resolving the contracting problems associated with asset specificity.

Regulation may be a less satisfactory alternative where contracting problems relate to the government's inability to clearly specify public policy objectives. While regulation incorporates a high degree of flexibility, it does commit the parties to some fundamental principles. Governments may not be able to make this commitment, if, for example, an important policy objective is contingent on economic circumstances. Governments can provide direction to regulators, but too much government interference will undermine the independence of the regulatory process. Where the nature of public policy objectives are such that a high degree of direction is required, public provision is likely to be most appropriate. The provincial electric utilities referred to earlier are mainly public corporations.

In those situations where regulation is a feasible alternative to public ownership - where, in other words, it cannot be ruled out because of the need for close policy direction - it is necessary to determine whether efficiency is likely to be improved by a shift from public to private ownership. When a shift to private production allows the government to take advantage of competitive incentives - as occurs, for example, when urban transit services are put out to competitive tender - there is a strong basis to expect

efficiency gains. There is no *a priori* basis to expect such gains when public provision is being replaced by regulated private provision. The regulatory authorities overseeing a private firm and the politicians and government officials overseeing a public firm face a similar problem of how to motivate managers to exploit their superior information in the public interest. It is not apparent that one arrangement offers "overseers" better information access and an improved capacity to influence corporate performance than the other. The analogy between the agency problem that exists under public enterprise and under regulation is demonstrated in a model developed by Rees (1987).

A comparison of public ownership and regulation should also take account of the fact that those fulfilling the role of "overseer" are themselves agents with interests that may depart from those of the ultimate principal. The agency problems arising from the delegation of responsibilities to politicians and the delegation to regulators bear special consideration in some circumstances. At the general level, however, the literature does not allow one to draw any overall conclusions on this issue that might tip the balance either towards public ownership or regulation.

Application to Roads and Airports

The preceding discussion suggests that to assess ownership and organizational arrangements for roads and airports, we must examine a number of questions: Are concerns about potential monopoly power justified, and/or are there other legitimate reasons for government intervention? Given the need for intervention, are there some circumstances where a short-term contract is feasible and the gains from competitive tendering can be realized? Is regulation a feasible alternative to public ownership or does it involve a limitation in the policymaker's flexibility that is incompatible with the nature of the relevant public policy objectives? What does the available evidence suggest about the efficiency of regulation compared to public ownership of roads and airports? Are there alternative institutional arrangements that offer to reduce the agency costs of achieving public policy objectives for roads and airports?

We examine these issues in the following chapters. Our examination of roads in the next chapter draws on available international experience with alternative organizational arrangements. Chapter 3 on airports focuses more directly on Canadian policy because the Canadian federal airport sector is in itself a useful laboratory for the study of alternative institutional arrangements. Chapter 4 presents some general proposals for the organization of roads and airports based on the conclusions drawn in the previous chapters.

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ENDNOTES

1. Although this is due to a market failure associated with the differential treatment of private and public sector risks, it does provide a rationale, in strictly financial terms, for public provision.
2. While public sector managers are not subject to the discipline that exists where ownership claims are transferable and there exists a competitive capital market, they are subject to monitoring and control by ministers and their officials along with the Auditor General, parliamentary committees and the media. Proponents of the property rights approach would argue that these compare poorly with market-driven control mechanisms. The principal-agent problem is more complex in the public sector due to the fact that government ministers, who are principals vis-à-vis public sector managers, are themselves agents vis-à-vis the electorate. It would be argued that the diffuse nature of public ownership and the non-transferability of property rights in a public corporation would undermine the incentives of both principals - the electorate and government ministers - to fulfil their monitoring roles.
3. Evidence is provided in: Borcherding, Pommerehne and Schneider (1982), Bish (1986), Kitchen (1976, 1986), Lave (1985), Savas (1980, 1982), Poole (1988), McDavid (1988), Hanke (1985), Moore (1987), Stevens (1984) and OECD (1987).
4. Williamson posits two behavioral attributes: "bounded rationality" and "opportunism." The former refers to the limits in the capacity of individuals to gather and process complex information. As a consequence, the parties to an exchange will have difficulty taking account of all the factors relating to a transaction. "Opportunism" refers to the tendency of economic agents to pursue their own best interest in a sophisticated and perhaps guileful manner.
5. This is discussed in Economic Council of Canada (1986), chapter 4.
6. Some of the problems are discussed in Baldwin (1989). See also Economic Council of Canada (1986), chapter 4.
7. Goldberg (1976).

CHAPTER 2 - ROADS

I. INTRODUCTION

In virtually all countries, and at all times, governments have constructed and maintained most roads and highways. There have been some important exceptions, notably the privately funded turnpikes established in the U.K. in the 18th century and in the U.S. in the 19th century, and the current extensive system of toll highways under private or mixed ownership in France, Italy and Spain. In recent years, these exceptions have become the focus of increasing interest. A number of governments are exploring the use of private roads, both as a way of responding to their backlog of transportation needs and as a means of realizing the efficiency gains that have been achieved through privatization in other areas. In the U.K., for example, private interests are being asked to bid on the development of a number of specific tolled roads and crossings. Following the recent passage of a bill to allow private toll roads, Sweden is considering some private sector project proposals. A number of states in the U.S. have recently authorized private toll roads. California has just completed a large competition to select four demonstration projects that private developers will build and operate under a 35-year lease.

In Canada, private firms have submitted bids for the construction and operation of a fixed crossing between Cape Tormentine, New Brunswick and Borden, Prince Edward Island. The intention is that the private sector will finance the crossing, operate it for 35 years and then transfer it to the federal government. Private investors are to derive revenue from toll charges (which are to be indexed to the regional CPI) and a federal subsidy, which is not to exceed the cost to the federal government of continuing to operate the Cape Tormentine to Borden ferry service.

More generally, private sector financial involvement is ostensibly appealing in view of the expenditures some believe are needed to upgrade and extend Canada's highways. The National Highway Policy Study prepared for the Council of Ministers Responsible for Transportation and Highway Safety has identified a number of deficiencies in the 24,449 kilometres of roadway which is designated as the "National Highway System" under the proposal. The required capital improvements were estimated to cost \$12.7 billion (\$1989), or to require a doubling of current annual expenditures on construction and rehabilitation for a ten-year period.

The Role of Government

There are a number of reasons why governments have traditionally assumed major responsibility for road construction. There has long been a view that roads convey benefits to a nation beyond those which are realized by individual users. Initial federal and provincial involvement was in the development of colonization roads. By World War I, the Good Roads Movement had succeeded in making road access for rural communities an important government objective.¹ There were a number of private

toll roads in the nineteenth century, but these had largely disappeared by the 1920s when provincial governments began to make a major commitment to expanding their road networks. The growth in provincial road expenditures, and the decision by the federal government in the late 1940s to undertake construction of a trans-Canada highway were motivated by a recognition of the social benefits of well developed road links. Highways were seen as an important element of nation-building. They were also a component of the basic infrastructure that was needed to promote economic development and to distribute the benefits of development to different regions of the country.

In addition, it has long been recognized that highways are different in a number of respects from other goods and services that can be efficiently provided by private firms. The "sale" of highway services requires the establishment of relatively costly toll facilities that effectively exclude those who are unwilling to pay the established charge. Moreover, the activities of individual highway users give rise to important benefits and costs of the sort that cannot be traded in the market. A private firm would be unable to incorporate these impacts in its own pricing and investment decisions and would not produce an efficient quantity and quality of highway services.

The technology of highway production also reduces prospects for efficient private provision. There are two problems here, both related to the fact that the provision of road services requires a major investment in a long-lived and specialized asset. The first is due to the existence of economies of scale, which means that, given the capacity of most highways, efficient prices will not provide investors with an adequate rate of return. Some recent studies have questioned whether urban roads are characterized by indivisibilities (Starkie, 1982), and subject to economies of scale (Keeler and Small, 1977; Kraus, 1981), but these results are not relevant to major highways outside congested urban areas where very different technical considerations apply. The second problem arises from the barriers to entry into highway production. Even in the absence of public entry controls, the large sunk costs associated with the provision of highway services would constitute a significant entry barrier. A lack of competition in the provision of highway services would not be of concern if reasonably good alternative services were available in the market. But this is not so; the data in Table 1, which shows that the automobile dominates intercity travel for one-way trips under 800 kilometres.

The Issues

As discussed in the previous chapter, the identification of public policy concerns does not in itself provide a justification for public ownership. What must be determined is whether public ownership is the most efficient and effective way by which to address those concerns.

Table 1

Percentage Distribution of Modes Used for Each Trip Length (%), 1988

	Auto	Air	Bus	Rail	Other	Total
Short Trips (80-319 km)	95.3	0.4	2.6	0.6	1.1	100.0
Mid-length Trips (320-799 km)	80.8	11.6	4.1	2.6	0.9	100.0
Long Trips (800-3199 km)	56.3	37.1	2.9	2.7	0.9	100.0
Transcontinental (>3200 km)	12.0	86.7	0.7	0.5	0.2	100.0
not stated	85.9	7.2	4.7	0.6	1.6	100.0
Total	89.8	5.1	2.9	1.1	1.1	100.0

Source: unpublished data from the Canadian Travel Survey.

There is a certain amount of international experience to draw upon in assessing the merits of private sector participation in road development. It's important, however, to clearly distinguish between two different types of involvement: in one case, a private developer constructs, or contributes to the financing of a road because it is expected to enhance the value of a residential or commercial project; in the second case, private entrepreneurs construct and operate the road as a commercial undertaking in its own right. While the first is not unimportant, it is the second that is of prime interest in terms of the potential for privatization of intercity highways.

In the next section we look at private road financing where this is ancillary to the development of a commercial or residential project. Section III goes on to examine the experience with toll roads that were constructed primarily as profit-making ventures.² While the existence of private roads in various countries, along with their historical roots in both Europe and North America, is often used to show that roads can be successfully privatized, the available evidence raises some troubling questions. In Section IV the arguments for privatization are assessed. Special considerations arise in those situations where competition exists and private roads are seen not to require government regulation; these are addressed in Section V.

II. ROADS AND PRIVATE DEVELOPMENTS

Private developers have made an important contribution to the construction of local, and particularly suburban, roads. It is common practice for municipal governments to require developers to provide internal roads for a new subdivision. Developers may also be asked to help finance off-site road improvements that are required to cope with the traffic generated by a new development. As a condition of

receiving project approval, the developer may be required to provide needed land, to make specific off-site road improvements, or to cover a proportion of road improvement costs calculated on the basis of the expected traffic impact of the development. Alternatively, the developer may take the initiative, offering to finance, or help support, an off-site road that is likely to be of major benefit to a private development.

While these funding arrangements provide a direct means for the private sector to signal its demand for new or better roads, they are not a reliable signalling mechanism. There would be reason for concern if developer funding was of sufficient importance to cause a serious distortion in public spending priorities. However, such distortions need not arise. Private funding can be accommodated within a budgetary allocation process geared to welfare maximization. As Nilsson (1990) shows, voluntary funding can improve welfare under conditions in which road construction is limited by budgetary constraints. Where an offer of partial funding for a certain road, say A, would result in the "crowding out" of an alternative, say B, the relevant welfare test requires that the net benefits from A exceed those that are foregone from the loss of B. If developers were prepared to completely fund A, it is necessary to simply ensure that the investment yields a positive social rate of return.

The internal roads constructed by developers are generally turned over to the municipality. However, there are some interesting historical examples of efforts to maintain residential road infrastructure under private ownership. The city of St. Louis in the U.S. contained an extensive system of privately owned and maintained residential streets through the latter half of the nineteenth century. The purchaser of a home in a community such as Vandeventer Place in the 1870s was in effect making a "tied purchase" which included an ownership share in streets and other infrastructure. Private ownership allows communities to overcome deficiencies in the provision and maintenance of urban infrastructure - and there is some evidence that this was a problem in St. Louis in the late 1800s (Beito and Smith, 1990). It also provides an opportunity for communities to acquire a quality of infrastructure more consonant with the specific preferences of its residents. But private ownership entails the need to establish a governing body to administer and enforce the long-term contractual arrangement among residents. The burden of these administrative costs will be higher than they would be if they were incorporated within the apparatus of local government and distributed over all the residents of the municipality.

Developing a suitable long-term contractual arrangement among the resident owners of private roads is also a significant challenge. As with any organization, there is a need to identify and enshrine basic principles while, at the same time, providing the necessary flexibility for the organization to adapt to changing circumstances. In the case of Vandeventer Place, management was initially assigned to three trustees, but later transferred to the lot owners. The latter's authority, however, was limited by an indenture or restrictive covenant that gave expression to the developers' intent to preserve the "pristine affluence" of the community. To this effect, homes constructed in the community had to exceed a floor price, set at a very high level. The restrictions in the covenant could only be revised by unanimous consent, which was virtually impossible in most circumstances. The authors of the indenture did not foresee the rapid growth of the city

which would transform the area surrounding Vandeventer Place into a busy commercial centre. In the early 1900s homeowners were squeezed by falling property values and mounting maintenance costs. Several of the houses fell into disrepair and had to be condemned. The final blow to the community came in 1947, when the government, exercising its power of eminent domain, demolished the eastern block of Vandeventer Place to build a veterans' hospital.

III. EXPERIENCE WITH PRIVATE TOLL ROADS

There have been attempts at various times in various countries to assign provision of road services to profit-seeking enterprises. Private firms construct and maintain the road, usually generating revenue through the collection of tolls. When roads are constructed as a commercial undertaking there remains the issue that proved so troubling to the residents of Vandeventer Place: how to establish a long-term arrangement - consistent with the long-life of road capital - that can be adapted over time to contend with unforeseen contingencies. But this problem now arises in a context in which the parties to the agreement - producers and consumers in this case - have quite distinct interests, and a contract that is incompletely specified is likely to result in potentially costly opportunism. Countries that have used private toll roads have experienced considerable difficulty resolving these problems.

Early Toll Roads

Over the late 18th and early 19th century, the U.K. responded to the strong pressures to improve its road system through the establishment of Turnpike Trusts. These were statutory bodies composed of independent trustees who were empowered to raise the capital required to construct turnpikes and to establish toll gates. By the 1830s there were over 1100 trusts responsible for administering 23,000 miles of road.

The trusts were public bodies, but because of their considerable autonomy, their experience sheds light on the potential pitfalls associated with the use of independent toll authorities, public or private. This turnpike system contributed to significantly improved road communication in England and Wales. However, it is generally agreed that this improvement came at considerable cost. Waste and inefficiency resulted from the lack of controls over the activities of trustees. This was initially the result of deficiencies among the numerous separate acts under which the trusts operated. But even after Parliament passed the General Turnpike Act of 1773 to introduce some common standards there was still "no effective checks on extravagance by trustees, no audits of their accounts, no limits imposed on their borrowing powers and no check on their power to divert and alter existing highways at will" (Savage, 1959, p. 25). Financial mismanagement was particularly evident in the collection of tolls. Testimony before investigating committees indicated that half of toll income reverted to officials, toll farmers and their small armies of professional 'pikemen'. Road maintenance suffered as a result, and many trusts were forced to issue bonds to cover interest debt and stave off collapse.

There have been different assessments of the impact of the turnpike system on the development of the U.K. road network. The general view has been that it resulted in scattered, unconnected routes, rather than a national system of road communication. Evidence cited by Button (1987), however, suggests that trusts responded to the road demand arising from the development of sectors and regions, and that the lack of continuity between key routes was not as significant a problem as had been portrayed in earlier literature. The advent of the steam engine in the mid-30s hastened the decline of the turnpike system - a decline which was already well underway as a consequence of the institution's fundamental weaknesses.

In the U.S., private turnpike companies were of importance in the period from about 1790 to 1830. Some of the companies relied on government equity participation, but many were fully dependent on private investors. The state exercised control through imposing conditions in the company charters with respect to construction, inspection requirements, toll collection right, toll rates and related matters.

The U.S. turnpike corporations were not beset by the serious inefficiencies and outright corruption that were a feature of the U.K. trusts. Healey (1940), for example, believes that "the lack of recorded criticism of road construction" is significant; and he finds that "such little cost data as are available do not indicate excessive organization expenses" (p. 90). But the U.S. turnpike corporations were exceedingly poor investments for their shareholders. Share prices typically sold far below their issue price within a few years. Usually turnpikes had to be taken over by governments, and investors received no compensation.

The financial problems of the turnpike corporations can be partly seen as a result of opportunism on the part of the state governments. The states did not allow toll gates to be positioned in such a way as to reduce the prospect of traffic diversion to non-toll roads. A particular problem was the proliferation of informal routes bypassing the toll gate, known as shunpikes. In allowing toll revenue to be eroded, state governments were in effect violating their implicit commitments to allow private investors an opportunity to earn a reasonable return. It is conceivable that this arrangement would have been successfully challenged had it persisted to the end of the 19th century, by which time - as Baldwin (1989) shows - U.S. courts had taken on responsibility to protect regulated firms from public sector decisions that effectively confiscated part of their property.

It is commonly argued that direct return to investors in U.S. turnpikes was less important than the indirect benefits in terms of higher land values, lower transport costs and faster development. But this is not a satisfactory explanation of investment behaviour, for, as Klein (1990) points out, the indirect benefits of turnpike construction were available to everyone; hence there would have been an incentive to "free ride" on the stock subscriptions of others. Klein suggests that the "free rider problem" was overcome by the strong social pressures of the time. Early American communities with their strong social ties and participatory ethic created pressures for each community member to bear his share of collective responsibility.

Private Sector Involvement in European Toll Roads

France, Italy and Spain provide more recent examples of private sector involvement in highway provision. In all three countries, governments faced financial pressures which attracted them to the prospect of tapping private sources of financing for needed highway expansion. In France, concessions were granted to four private companies in the early 1970s, following a little over a decade of experience with mixed enterprises (*sociétés d'économie mixte* or SEMs) in which local authorities were usually the majority shareholder. Spain turned to private developers as the country's rapid growth through the 1960s began to strain the capacity of the transport system. Following the decision in 1967 to embark on a major program of intercity expressway construction, concessions were awarded to five private companies. A further expansion in the number of private toll road companies occurred after the decree of December 1, 1973 authorized the granting of concessions in accordance with prescribed conditions - including the requirement that at least 45 percent of the required capital be raised in foreign markets. Although Italy had contracted with private companies for some of its first motorways, the country's toll highways are now operated by 22 concession-holding companies, in which public entities (including local authorities) have majority ownership. The largest of these Italian companies, the "Autostrada" is responsible for about half the country's tolled motorways.

The establishment of toll authorities helped to finance a major expansion of the highway network in all three countries. It is reasonable to expect, for example, that Italy's 2000 kilometres of toll expressways would have been built much later without the contribution of concessionaires. In France the four private consortia constructed 1300 kilometres of roadway, and in Spain private concessionaires developed around 2000 kilometres of expressway. As compared to the earlier experience with turnpikes, toll revenue was more assured because of improved institutional arrangements. This applies both to the internal control structure by which concessionaires administered their own operations, and the contractual arrangements which governed the relationship between the concessionaire and the government. Nonetheless, and despite considerable government support, private firms had difficulty contending with the high degree of financial risk. In Spain, much more adverse economic conditions than had been anticipated in the period after 1973 caused the finances of private firms to deteriorate. The government took over three of the companies in 1984 and amended the original terms of its agreement with the other concessionaires. A new state corporation, "Empresa Nacional de Autopistas," was formed to administer the new holdings, and to provide the Spanish government with an instrument to initiate the construction of new tolled motorways. In France, the private firms were financially squeezed over the latter half of the 1970s due to sharply rising construction and operating costs, a sharp slowdown in traffic growth and stringent government controls on toll charges. The situation further deteriorated in the early 1980s when there was an international economic downturn and a sharp increase in fuel prices. The government subsequently purchased all but one of the private companies, transferring them into SEMs.

European experience with private toll roads provides further evidence of the costs and difficulty of negotiating and executing a long-term contractual arrangement

given "bounded rationality" (and thus the inevitability of unforeseen contingencies) and "opportunism." Private road firms were adversely affected by a number of unexpected developments, including particularly the oil price shocks of 1973-74 and 1979. While those firms that were directly affected by the upsurge in construction costs over the 1970s may have experienced financial difficulty even under a more flexible system, their problems were at times exacerbated by the rigidity of the regulatory process. In France, the Ministry of Finance allowed tolls to increase at only about half the rate of inflation through the 1970s. It is contended that this violated the terms of agreements under which private concessionaires were to be allowed to set their own toll rates for an initial period.³ The four private companies tried unsuccessfully to sue the French government for breach of contract.

There are also indications of opportunism on the part of the private concessionaires. Gomez-Ibanez and Meyer (1992) note that, in both France and Spain, there was suspicion that some firms were interested primarily in obtaining a lucrative construction contract rather than operating a successful toll road. The motivation of owners to control costs and sustain an operating entity was weakened by low equity requirements and generous government loan guarantees.⁴ Loan guarantees also reduced the pressure on private lenders to monitor construction costs and ensure that roads were kept in good repair.

Even the more successful private concessionaires have engaged in opportunism. In Spain, the nine surviving private firms have used their bargaining strength to successfully negotiate a new system of toll regulation. The new system, under which toll increases are based on 95 percent of the increase in the consumer price index, could provide very high returns on some of the four concessions that have already achieved reasonable levels of profitability.

There is no evidence that high transactions costs were justified by gains from the increased efficiency of private concessionaires. The scope for private sector entrepreneurship was circumscribed; governments determined when and where highway development would occur and agreements often specified the technical standards, construction schedule and financing arrangements. Private sector involvement can provide a check on the soundness of government investment decisions, but not when government substantially underwrites private sector risks, as was generally the situation in the three countries.

The one example of lower private sector costs comes from the experience of COFIROUTE, the only remaining private concessionaire in France. According to evidence cited by Gomez-Ibanez and Meyer (1992), COFIROUTE's construction costs per kilometre were 23 percent below those of the SEMs. The difference is attributed to more cost-sensitive roadway design and higher productivity of labour and equipment. The (limited) information available on other private concessionaires suggest that COFIROUTE's experience was not representative. In both Spain and France, there has been concern that construction costs were unnecessarily high in some cases because private firms were attempting to maximize construction profits. In Spain, these concerns were reinforced by the finding that the discrepancy between actual and projected

construction costs on some private roads was well beyond what could be justified by increases in factor costs.⁵

IV. ASSESSING THE GAINS FROM PRIVATIZATION

Productive Efficiency

There have been no comparisons of the overall costs of providing road services through public and private production. Aside from the limited examples of strictly private provision, this exercise would be complicated by the difficulty of controlling for all the factors besides ownership that influence production costs. The latter will depend, for example, on the terrain, the design of the highway (including the number and type of access routes), traffic volume, and traffic mix.

There have been a few attempts to compare projected costs of public and private provision on particular projects. One of the most thorough exercises was undertaken by the State Corporation Commission (SCC) of Virginia, which was required by law to estimate the implication of alternative proposals to build the 15-mile Dulles Toll Road Extension. Gomez-Ibanez and Meyer (1991) review the SCC's analysis of public and private projects and find that much of the reported difference in costs represents transfers rather than real resource savings to society. While public provision would benefit users through a lower toll, this was not a result of real resource savings; rather, it was a result of the state department of transport's "greater ability to transfer costs to other parties (primarily taxpayers)" (p. 206).

A number of judgements underlie the assessment by Gomez-Ibanez and Meyer. They discount the private corporation's claim that it can deliver the project more quickly because of its disappointing performance to date. More questionably, they argue that state taxpayers should receive the same return on those funds that are equivalent to equity as private shareholders. The underlying assumption that risks are the same for public and private shareholders may not be valid.⁶ The high risks faced by private shareholders are likely to be due in part to uncertainty about future actions of the state. Shareholders must contend with the possibility that future governments may not adhere to the letter and spirit of the agreement. By eliminating this element of risk, public provision does provide real resource savings.

The impression that, as a general proposition, we should not expect significant gains by replacing a public road monopoly with a private one is consistent with the results of empirical studies comparing the performance of public and regulated private firms in other industries. U.S. electrical utilities have received the most attention. The main studies - which are reviewed by Millward (1986) and Boardman and Vining (1987) - have concluded that, after allowing for differences in output mix and input prices, public sector utilities typically have lower unit costs than privately owned utilities.⁷ Vickers and Yarrow (1989) suggest these studies may have failed to adequately adjust for the lower input prices facing public utilities. A study that attempted to correct for this (Edison

Electric Institute, 1985), found that ownership has little effect on internal efficiency. Studies of U.S. water utilities have similarly produced conflicting results on the comparative efficiency of public and regulated private firms.⁸ A recent study of public and private telecommunications companies in Canada also failed to find significant difference in performance.⁹

It has been suggested that these traditional problems of regulatory control could be overcome through appropriate privatization of highways. Geltner and Moavenzadeh (1987) have proposed that a maximum allowable toll be established, based on the formula for efficient road pricing, and be fixed as part of the terms of sale of the highway. The new private owner would have an incentive to minimize internal highway maintenance costs, and this would improve upon the situation under traditional rate-of-return regulation where there are very weak incentives to curtail production costs. However, this proposal is simply an application of Demsetz's model of competitive contracting to the highway mode. It is subject to the limitations of that model that were identified by Williamson and discussed in Chapter 2. In essence, Geltner and Moavenzadeh resolve the problem of regulatory incentives by ignoring the need to build in an adjustment mechanism so the implicit long-run agreement between the government and the firm can be adapted to changing economic conditions and unforeseen conditions. As we noted in the last chapter, this is precisely the role that regulation is intended to fill.

Highways are not more amenable to regulatory control than other monopolies. Indeed, in highways, there are additional reasons to question the scope for efficiency gains from a shift to private regulated provision. There are two underlying considerations. The first is related to the notion that "a road is a road". While there are certain opportunities to provide new, specialized road services, and to introduce new methods of road construction and road maintenance, the potential for major innovations in product design or production is more limited than in other areas. Roads differ from more dynamic sectors where public sector rules and procedures may conflict with the freedom and flexibility needed to take advantage of rapid technological change. Secondly, and probably more important, is the fact that governments contract-out main highway construction and maintenance. Competitive contracting allows the public sector to benefit from any efficiency gains resulting from cost-cutting or innovation by private sector firms. The extensive use of contracting-out in the provision of highway services greatly limits the scope for differences in productive efficiency between public and private highway ownership.

Allocative Efficiency

What many would see as the main benefit of private ownership is the establishment of a closed toll-dependent financial system in which drivers are exposed to the cost of road use and infrastructure providers are made aware of consumers' willingness to pay for road services. However, the link between private ownership and efficient pricing and investment is not nearly as direct and strong as it may seem at first blush.

An initial problem is the assumption that, with private ownership, road investment decisions will be governed by commercial criteria. But, by accepting private toll roads, governments do not give up their power to decide the location and timing of new road investment. We explore this issue in the next section.

Where private road owners possess monopoly power and they are allowed to maximize profits, both pricing and maintenance investment will, in most situations, depart substantially from what is desirable in terms of efficiency. Mohring (1984) shows that, in the presence of congestion, monopoly prices will bear a relationship to social marginal costs. At other times, prices will be set well above the efficient level as the firm exploits its ability to generate excess profits. Highway maintenance will be socially suboptimal because the monopolist will not be under pressure to fully incorporate the effects of road deterioration on user costs (i.e. vehicle wear and tear, extra travel time and discomfort) in its investment decisions. Using a model of highway quality maintenance and some assumptions about the representative value of the relevant variables, Geltner and Ramaswamy (1987) estimate the fully capitalized value of the qualitative difference between the welfare-maximizing and profit-maximizing highway at between \$0.3 million and \$1.3 million (1987 dollars) per mile.

Of course, private road owners generally aren't free to set prices which maximize profits; tolls on private road concessions are usually subject to regulation. Moreover, the relevant comparison is not with a theoretical ideal, but with the highly imperfect system of pricing and investment that exists under public ownership. It has long been recognized that fuel taxes and licence fees fail to reflect the social costs caused by vehicles. A particular concern has been the inadequacy of the charges levied on trucks with a heavy axle weight, given the contribution of these vehicles to road wear. Data for Canada gathered by Nix (1989) indicate that user charges for passenger cars and other light vehicles are higher than justified by the damage they cause to the road, while charges for trucks and other heavy vehicles are too low. User charges would be higher, and the extent to which heavy vehicles are undercharged would be greater, if externalities (particularly environmental and congestion delay costs) were taken into account. Similarly, in the U.S., it has been found that fuel taxes and licence fees do not reflect the road-wear costs imposed by users. In addition, Small, Winston and Evans (1989), contend that road-wear costs are higher than they would be if public roads in the U.S. were constructed to optimal quality (thickness) standards, based on the results of cost-benefit calculations.

It is possible to point to some promising developments in policies governing publicly-owned roadways. Since 1978 New Zealand has applied a licensing system in which fees are scaled to reflect the road-wear costs caused by different vehicle types and varying degrees of road use. A similar system is being introduced in Australia. There have also been various attempts at the local level to reduce the social costs from road congestion. Rather than using a pricing approach and imposing peak-period charges on congested roads, governments have opted for less optimal but presumably more practical approaches. An area licensing scheme has been successfully used in Singapore for some time; vehicles must display the required licence when entering and operating within

the restricted zone. In Oslo, Norway, drivers using downtown streets must pay a toll charge that is intended to discourage city driving.

In principle, private toll roads should be superior to even a finely differentiated licensing scheme, in terms of their ability to acquaint travellers with the resource costs of road use. In practice, toll systems have been subject to a number of major deficiencies. Where toll roads are appended to a system of largely toll-free roads they are often distortive. The diversion of traffic from tolled to untolled roads can result in a significant misuse of the road system.¹⁰ It has been estimated that some 15 per cent of users are diverted by tolls in the U.S.A. to more costly routes (Smith and Wuestefeld, 1983). In the U.K. there has been concern that tolled crossings may work against the government's efforts to encourage development in a number of depressed regions of the country. In Spain, tolls charged by concessionaires on the main expressways are believed to cause a significant traffic diversion to other routes.¹¹ The need to ration road space on congested routes during peak periods could in theory be addressed through time variable tolls, but toll systems have lacked this flexibility in practice. In addition, tolls have been a relatively costly means of raising revenue. Costs include direct collection costs - which have amounted to between 10 and 15 percent of toll revenue in OECD countries - and the costs of traffic delays caused by vehicles stopping at toll booths. While new electronic vehicle identification systems which can considerably reduce the costs of implementing a road charge system have been successfully tested, these raise practical, and possibly political, difficulties, and they are unlikely to be viable on lower density components of the road system. It has been suggested (Newbery, 1990) that public opposition to electronic tolls would diminish if it were clear that these were replacing other road charges; this is more feasible when tolls are implemented by governments and applied where desirable within the overall road system.

Studies comparing regulated monopolies and public enterprises in other areas of economic activity suggest that allocative efficiency is not inherent to any particular form of ownership. For example, Vickers and Yarrow (1989) review studies on the introduction of sophisticated time-of-day pricing schemes for electricity, and find that the most important determining factor is not ownership, but the quality of oversight and direction. Where importance is attached to allocative efficiency, this will be reflected in the pricing and investment behaviour of public firms. The publicly owned electric utilities in Britain and France, for example, were early proponents of highly efficient peak-load pricing. Available information suggests that, similarly in roads, the critical determinant of allocative efficiency is the government's willingness to adopt a road pricing structure that reflects the social costs of road use - and not ownership per se. However, where a private toll road is appended to a system of controlled roads it is often difficult to establish even an appropriate "second-best" pricing regime.

The latter problem would not exist if the entire highway system was to be privatized, although evidence suggests that "second-best" rather than efficient prices would be required to remunerate private investors (or to provide cost recovery on a public highway system). Small, Winston and Evans (1989), for example, found that the revenue from appropriate congestion tolls and road wear charges would cover at least 80 percent of long-term capital and maintenance costs on major urban roads. But congestion

charges were found to be, by far, the major source of revenue - accounting, generally, for fifty to sixty times the revenue from road wear charges; and so, for major portions of the national highway system where congestion is not a significant issue, efficient pricing would result in revenues well short of expenditures. Similar conclusions are suggested by Newbery (1990). From his examination of road data on Great Britain, Newbery estimates that congestion charges would amount to 92 percent of the total appropriate charge. But congestion costs in the U.K. differ dramatically by time of day and location; average congestion costs in urban central areas at peak hours are more than 100 times costs for the average motorway or rural road.

With the focus being on the privatization of individual links in the system, the problem becomes one of identifying routes for which demand is relatively inelastic and the establishment of tolls at a level required to cover average costs would not lead to a significant traffic loss. In some such cases, because of low traffic volume, tolls would need to be marked up substantially above marginal costs. Although efficiency losses would be minor if traffic was largely captive to the route, such tolls are likely to be seen as highly inequitable, particularly if they are superimposed on general user fees that are close to covering the overall costs of the road system. Some have argued, more generally, that tolls are only likely to be acceptable on new roadways, where the additional benefits being received for toll payments are apparent to users. If so, this further reduces the potential candidates for private sector provision. As opposed to inviting tenders for a single route, the government could attempt to interest private developers in a network consisting of a mix of potentially profitable urban, and probably unprofitable, rural roads. This emphasis on the viability of a network, as opposed to a route, has been a part of the more recent approaches to toll concessions in both France and Italy. But the need to assemble a network that is attractive to private investors considerably raises both the scope and complexity of the task of implementing privatization.

A different approach to the problem is for the government to directly compensate the private concessionaire. While subsidies could be provided to make up for the revenue shortfall from appropriate toll pricing, it will generally be more efficient for the government to raise all the required revenue itself and pay an appropriate "shadow toll" based on road use to the private concessionaire. Here, the government is essentially renting road space from a private supplier. Shadow tolls were rejected after being given serious consideration in the U.K. A number of explanations were offered, including the fact that "shadow tolls are imperceptible" and therefore do not present road users with a true signal of costs. But the main concern seems to have been that shadow tolls involve a "back-door" commitment of public funds, not unlike that which would result had the government financed the investment itself.

Government Objectives and the Need for Flexibility

In the last chapter we noted that the choice between public production and regulated private production should be based not only on efficiency, but also on the nature of public policy objectives. Where these cannot be defined with reasonable

precision, the government will be unable to delegate decision-making to a regulatory board. A public corporation, which allows for closer and more informal direction and control, will be more suited to the government's policymaking requirements.

In the case of highways, the need for flexibility is most apparent with respect to new investment decisions. The choice of where and when to construct a new route will create winners and losers. It will have potentially significant implications for the development of various regions. Governments must exercise their powers of eminent domain to acquire the land and rights for road construction, and they must address increasing concerns about the environmental impacts of such projects. These issues touch on a number of important political and policy objectives. But it would be exceedingly difficult for governments to translate the relevant objectives into guidelines that could be applied by a regulatory board. Accordingly, governments in all countries, including those with private concessionaires, have closely guarded their authority over major new road investment decisions.

One implication of this is that privatization cannot be expected to resolve the misallocation of investment in the highway sector. Friedlander (1965) has suggested that this is a serious problem in the U.S., where there has been an over-investment in rural interstates, and an under-investment in urban highways. A very different road pattern would no doubt have resulted if highway investments had been made by private firms in response to users' willingness to pay. But governments do not regard profitability as the only or the prime consideration. And they would have great difficulty identifying the other factors that enter into the decision-making calculus underlying new road construction.

The desire of governments to maintain their freedom of control over the timing, location and nature of new highway investment will limit the potential allocative gains from privatization. In addition, however, it will, at times, make it very difficult for governments to negotiate any sort of long-term arrangement with a private firm. While the commercial viability of a private highway project will often depend on the lack of competing alternatives, governments may be unwilling to commit themselves in this way and restrict their investment options over the next 30 or more years. Governments' desire for flexibility with respect to investment decision-making may thereby exacerbate the already difficult problem of attracting private investment to highway infrastructure development.

V. PRIVATIZATION UNDER COMPETITIVE MARKET CONDITIONS

While privatization of most segments of the highway system would entail concerns about the potential for monopoly power, this is less clearly the case on congested routes within or near major centres where traffic density can justify two or more competing roads. With the availability of a private tolled road, those road users who have more urgent needs or who value their time more highly, will have an alternative to the congested, toll-free public highways. Traffic density will help to make a private tolled commuter route commercially viable.¹² At the same time, the availability of a free public

alternative will limit toll rates on the private road, and regulatory control may be unnecessary.

A number of major private projects without toll regulation are underway or being planned:

- California Toll Roads: The state recently signed an agreement for the construction of four private expressways estimated to cost \$2.4 billion (U.S.). The private consortia will have to comply with requirements set by the California Department of Transport (Caltrans), and obtain necessary state and federal environmental permits. The roads will compete with existing public routes. Toll rates are not to be regulated, but there is to be a ceiling on the consortia's allowed rates of return.¹³
- Birmingham to Manchester Toll Road: This is one of a number of proposed road projects the U.K. government has opened to competitive bidding by private developers. The intention is to have a privately financed alternative route to the M6 link between Birmingham and Manchester, which is congested and carries a high percentage of heavy goods vehicles. The specific route, the design of the road, and financing arrangements are all subject to competitive bidding. The road must meet government engineering standards and comply with environmental requirements. Tolls will not be regulated.
- The Channel Tunnel: In 1987 the U.K. and French governments awarded a monopoly franchise to a private company, Eurotunnel (ET), to build a 31-mile rail only tunnel between Dover and Calais. The company will provide rail access to the U.K. and French national rail companies and also offer its own shuttle service for cars, trucks and coaches. ET originally raised £6 billion (£1 billion in equity, and £5 in loans from a consortium of 60 international banks), but has had to augment this as construction costs increased to over £8.0 billion (from the originally estimated £4.8). Tunnel charges are not to be regulated; reliance is instead to be placed on the competition provided by existing ferry services. ET's franchise is to last to 2042, at which time ownership reverts to the U.K. and French governments.

In all these cases, financial considerations were of importance. This was particularly so in California, where constitutional requirements for a balanced budget along with voter opposition to significant tax increases have prevented the public investment needed to address the state's serious road congestion problems. However, privatization is also expected to provide gains in the form of innovative new services, more aggressive marketing and pricing strategies, and initiatives to fully exploit the revenue potential of the property abutting the roadway.

While there has been a tendency to compare the benefits of private risk taking in such road developments to the advantages of private entrepreneurship in other economic activities, there are important differences. First, the road sector is not subject to the full checks and balances of the competitive market system. Although there may be

competition from an alternative route, entry into and exit from the "road market" are subject to major constraints. Indeed, the possibility of new entry, in the form of a competing route, may be specifically excluded by the terms of the government's contractual arrangement with the private road developer - as is the case with the California toll roads. Free entry and exit are important both as a form of market discipline as a mechanism to help normalize rates of return, and their absence represents an important market weakness. Secondly, since, under most agreements, the infrastructure is to be transferred to the public sector after a defined period, governments have an interest in ensuring that the facility is not allowed to deteriorate over the latter part of the specified term. In addition, in some cases, there will be a commitment of public resources to the project. Where this takes the form of loans, loan guarantees, or assistance in meeting liability insurance costs, governments will have a responsibility to monitor corporate decisions and ensure that the public sector's financial interest is adequately protected.

The effect of these factors is to create a continuing need for government oversight of private sector road developments. The public interest cannot be left solely to market forces; there is also a need to rely on protection incorporated within the government's contractual arrangement with the developer. But as the emphasis shifts from market incentives and constraints to those that are contractually negotiated, the longer-term features of the contract between the government and the private developer become increasingly important. The focus is now not simply on a construction contract, but also on a long-term operating agreement specifying the rights and responsibilities of the two parties over a 30 or more year period. Hence, the problems associated with implementing a long-term contractual arrangement - the same issue that exists when the private sector road developer is a monopolist - must again be addressed. The question is whether the gains from utilizing private sector entrepreneurship outweigh the costs arising from these contractual problems.

The agreements that governments have negotiated with the four road developers in California and with the builders of the Channel Tunnel are impressive in detail. But, it is impossible to anticipate, and adequately provide for, all potential contingencies. Experience shows how unforeseen changes in technology and market demand can impose strains on the most carefully crafted contractual arrangements. What is of concern is not simply the existence of uncertainty, but the fact that these adjustments will have to be worked out in a situation of bilateral exchange. In this trading environment, the costs of adjustment, and the risks of opportunism to which both parties to the agreement are subject, tend to be substantial.

A recent study by Kay, Manning and Szymanski (1989) explores some of the uncertainties associated with the building of the Channel Tunnel.¹⁴ Incorporating ET forecasts of the growth in channel traffic into their model, Kay et al. find that the Tunnel is both socially and privately profitable.¹⁵ But, as long as there is effective competition from the Channel ferry companies, ET profits are slim and sensitive. Using a less optimistic growth forecast, private profits disappear, although net social benefits remain substantial. Similarly, with the introduction of more efficient ships, which reduces the operating cost of competing ferry operations, the tunnel is likely to be unprofitable,

although it would continue to provide a positive social return. Another scenario that Kay et al examine is one in which the Tunnel forces ferry operators out of the market and successfully transforms itself into a monopoly. In this case, consumers do not benefit from lower prices, and all gains accrue to the Tunnel owners who are able to capture monopoly profits.

In the California case, private road owners could also come to possess considerable market power. As traffic volume grows and congestion increases, the available toll-free public routes are likely to become increasingly unacceptable alternatives for many drivers. Those projects that are to serve rapidly growing communities should also benefit from substantial revenue growth in coming years. The risk-sharing agreement between the private companies and Caltrans sets an upper limit on the companies' allowed rate of return, but it is a high limit - 17% to 21.25% after tax return on investment capital, with upward adjustments over time to take account of the impact of inflation on the cost of equity capital.¹⁶ And the calculation of the companies' rates of return for this purpose does not include indirect revenue which may come from rental of air rights, private real estate development and interchanges or station stops, or the transmission of water, gas, etc. using the road companies' right of way. There is therefore considerable scope within the agreement for companies to increase their toll revenue. Indeed, even after firms bump up against their ceiling rate of return, road users are not protected against further toll increases; the concern, as in other sectors, must be that limiting firms' rates of return will simply result in reduced incentives to control costs and curtail x-inefficiency.

After construction, ownership of the four California roads is to be transferred to the state, which will then lease the facilities back to the private developers. This circuitous approach which was taken to transfer accident liability to the state, raises new possibilities for conflict. The state's interest in, and perspective on, adequate maintenance and repair will not be identical to that of the private owners.¹⁷ Over the course of the agreement, differences may emerge in interpreting the evidence on road wear and in assessing maintenance requirements. Within the next 30 years, new innovations in road transport are likely to come on scene, and these could conceivably have important implications for road wear as well as for the extent of the state's liability. Difficult bilateral bargaining will be necessary to adapt the agreement to such developments.

It is not only the government that must contend with the risks of opportunism. The private road developer, for his part, is vulnerable to the vagaries of public policy. This could, for example, result in the demand for new access roads, or in pressure to reduce toll charges to encourage certain behaviour (such as car pooling) or the use of certain types of technology (i.e. stricter emission standards). There may be public pressure to reduce traffic during certain hours or to restrict heavy vehicle usage. State and local policies may lead to a pattern of residential and commercial development very different from what the road developer had initially expected. Notwithstanding any commitment or understanding in the original agreement, policy-makers may succumb to the pressure to construct new public roads that compete in some part with the private toll facility.

The transactions costs associated with a long-term contractual arrangement must be set against the gains from the private provision of roads. It is again the case that private provision is neither necessary nor sufficient to achieve gains in allocative efficiency. However, the incentives to be productively efficient are likely to be somewhat stronger under private than under public ownership, where private firms are not regulated and are not subject to, or are operating well below, a ceiling rate of return. The incentives for efficient performance of commercial activities are generally stronger within unregulated private firms, than within government departments or public enterprises. However, the significance of this difference is less clear in road provision than in other areas of economic activity. It is necessary, as before, to consider that the publicly-owned alternative is likely to involve contracting-out of both road construction and road maintenance and repair. As a result, private road ownership is not needed for the government to be able to capitalize on the innovations and productivity improvements that have occurred in road building.

In the California case, in particular, the private road consortia have been enterprising in identifying profit opportunities. In addition to toll revenue, the firms intend to exploit the potential from the leasing of air rights along the highways and rest areas, from developing the land around interchanges, from negotiating with developers and municipalities seeking improved road access, and from the leasing of space for cables and pipelines that could be buried along the toll road rights-of-way. These developments cannot be interpreted strictly as a productivity improvement. The objectives of private road developers are quite different from those of government. What made privatization possible in California was the willingness of the state to modify its policy objectives and to adjust its regulatory framework to accommodate the needs of profit maximizing road developers. While one might expect that private firms are better able than government to exploit the revenue potential of the right-of-way, roadway development would also be quite different under public ownership if revenue generation was a main objective.¹⁸

VI. CONCLUSIONS

The search for new sources of financing has given rise to a variety of initiatives to involve the private sector in road provision. One result has been the imposition of new taxes and regulatory requirements designed with a view to extracting some of the benefits public roads provide to private developers. More interesting and important have been those initiatives which involve the delegation of the public sector's traditional role of providing and maintaining roads to private, profit-oriented concessionaires.

Private roads may not be commercially viable. Indeed, it will be difficult to identify new intercity routes that could be attractive to private investors. Moreover, the owner of a toll roadway, for which there are no reasonable alternatives, will possess considerable market power. But concerns about the inadequacy of toll revenue on one hand, and the potential for monopoly profits on the other, do not in themselves preclude private provision. What makes these issues particularly difficult to address is the technology of the road sector, and particularly the importance of sunk capital. The latter

eliminates the possibility of meeting public policy objectives through efficient, short-term, competitive contracting arrangements. The alternative of a long-term arrangement is much more problematic, as early experience with turnpikes and more recent experience with private highways in Europe indicates.

While regulated private provision can be a viable alternative to public provision of a monopoly service, the evidence from other sectors does not suggest that such a change is likely to result in a significant improvement in efficiency. In roads, the scope for regulation is likely to be limited because it would be difficult for governments to delegate decision-making with respect to new road investment to an independent board. Moreover, under public ownership, much road construction and maintenance is already contracted out to private firms. The privatization of individual routes would also present complications that do not arise in other sectors; where a tolled road is appended to a system of untolled roads special care must be exercised to ensure that the result is not highly distortive or inequitable.

Many of the same considerations apply where there is a competitive alternative to the private road and regulation is not required. Private firms will be subject to somewhat stronger incentives to reduce costs and exploit profit opportunities in this situation. However, because of the possibilities for the public sector to contract out road construction and maintenance and governments' inclination to control new road investment, the scope for efficiency gains will continue to be limited. At the same time, the negotiation and implementation of an arrangement between the government and a private road operator could consume a significant quantity of real resources.

A number of studies have indicated that there are important gains to be realized through more efficient road pricing and investment. But these are not organizational problems. The solution lies in an appropriate shift in government objectives and priorities, not in privatization. We return to this issue in chapter 4.

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ENDNOTES

1. Owram (1991).
2. As will be seen when we look at the early U.S. turnpikes, the motivation for private investment in roads is not always entirely clear.
3. Gomez-Ibanez and Meyer (1992).
4. In France, only 8 percent of the financial requirements of the private concessionaires were met through equity contributions. Over half of the required funds came from state-guaranteed loans. In Spain, concessionaires relied on foreign debt, on which the government provided both guarantees and exchange insurance, for just over half their capital requirements. Equity investment covered about 12 percent of capital requirements.
5. This was noted in report to the Spanish legislature in 1984 by Julian Campo, the then Minister of Public Works. The information is from Gomez-Ibanez and Meyer (1992).
6. Risks may also be higher with private than with public provision, if private provision involves a greater concentration of risk. However, the stock market allows the risks of private sector activities to be widely diffused.
7. Studies comparing public and private costs of electricity generation in the U.S. include Meyer (1975), Yunker (1975) Pesatrice and Trapani (1980), Fare et al (1985).
8. Crain and Zardkoohi (1978) found that unit costs were lower in regulated private water utilities than in public utilities. A more recent paper by Bruggink (1982) reached the opposite conclusion: that unit costs are lower in public water utilities.
9. See Denny (1986).
10. Waters and Meyers (1987) provide a relevant Canadian example, showing how the net benefits of B.C.'s Coquihalla highway are reduced with the imposition of tolls.
11. Gomez-Ibanez and Meyer (1992).
12. However, the high cost of land can push up the construction costs of roads near major centres. As a result, congestion-relieving roads may not be commercially viable if private developers are required to purchase the required rights-of-way at market prices.
13. While the establishment of a maximum rate of return is a form of regulation, it differs in a number of important ways from traditional economic regulation. In particular, firms will be unaffected by the control on profit rates, unless and until they bump up against the established ceiling.
14. Uncertainties pertaining to the contractual commitments of the parties have already given rise to disputes during the construction phase. One source of dispute has arisen as a result of demands by the U.K. and French governments for extra safety and fire precautions on the shuttle trains. Eurotunnel claims that this has increased the cost of rolling stock above the original estimates and will delay the tunnel opening by three months. The company intends to take legal action against the two governments for breach of contract.
15. Calculations in this study were based on the original construction cost estimates for the Tunnel of £4.8 billion. As noted, current cost estimates are over £8.0 billion.

16. The justification provided for this high rate of return is that the projects entail a high degree of risk. But, if the government is less risk averse than private firms, the payment of such a risk premium is an additional cost of privatization; it must be set against any cost savings from more efficient private sector production. While public investment may not offer any advantages in terms of risk pooling, given the existence of reasonably efficient equity markets, it does eliminate the need to provide compensation for the possibility of opportunism by the state. This is another reflection of the possible gains from internalizing transactions involving asset specificity, as discussed in the last chapter.
17. This was noted in the discussion of allocative efficiency in Section IV. See Geltner and Ramaswamy (1987).
18. Governments could conceivably tap the ingenuity of the private sector in this regard by contracting out project design, and including revenue generation as one of the main criteria for contract selection.

CHAPTER 3 - AIRPORTS

I. INTRODUCTION

While with airports, as with roads, the infrastructure is largely publicly-owned and operated, one can find examples of a variety of organizational alternatives. Publicly-owned airports may be operated by governments, by local communities or by public authorities. There are privately-owned airports, and airports that are operated by private firms under contract, or under a long-term lease arrangement.

Different organizational arrangements are partly a consequence of the distinct historical influences across countries. But more recent organizational reforms can be related to government efforts to respond to some common pressures. These include the general pressure to control government deficit spending and the particular pressures within the airline sector arising from the deregulation of the airline industry and the increase in air traffic.

In Canada, there are just over 2000 aerodromes, 575 of which are open to public use. The subset of these airports which are owned and/or operated by the federal government provides a useful window into the main organizational issues. The federal sector covers airports subject to a variety of different organizational arrangements. It includes small rural airports, and Lester B. Pearson International Airport (LBP) in Toronto, Canada's major hub airport, handling over 20 million passengers and 350,000 aircraft movements a year. Airline deregulation has impacted most directly on LBP where aircraft movements have increased by over 50% since 1984. It has also resulted in increased activity at federal airports which have become important regional hubs, such as Vancouver International Airport (VIA), and Halifax International Airport.

1. Federal Airport Policy

Table 1 provides an overview of federal involvement in the airport sector. The first three columns of the table pertain to airports owned and/or operated by Transport Canada. LBP, VIA and Halifax International Airport are three of the Major Federal Airports (MFAs) that are owned by the federal government and overseen by the Airports Group within Transport Canada. The other MFAs are in: Montreal (Mirabel and Dorval), Ottawa, Winnipeg, Calgary and Edmonton. The importance of the MFAs in terms of total commercial airport activity can be seen from Table 2. Until March 31, 1991, the MFAs were treated as a distinct entity for accounting purposes, operating under the Airport Revolving Fund.

The federal airport sector (the first 3 columns of Table 1) also consists of 79 smaller airports that are operated directly by Transport Canada, and another 88 federally-owned airports that are operated by municipalities, provinces or territories, or private management firms. The facilities operated directly by Transport Canada include major carrier airports such as St. John's, Gander, Sydney, Regina and Saskatoon; smaller

commercial airports such as Prince George, Lethbridge and Yarmouth; and general aviation airports such as Pitt Meadows (near Vancouver) and Springbank (outside Calgary).

In a recent report, the Auditor General notes that the Transport Department "has been trying to rationalize its role in airports for at least ten years." The most recent attempt to develop a management framework, which was introduced some four years ago,¹ emphasizes the need for a more commercial orientation. This is seen as a way of allowing airports to be more responsive to the needs of a deregulated airline industry. It also offers the possibility that private investors or other governments can undertake some of the capital spending required to expand and upgrade federal airports. It has been estimated that additions at Toronto and Vancouver alone will require expenditures between \$2 and \$3 billion over the next decade.

One of the aims of recent reform has been to strengthen accountability both for the major federal airports and for the Airport Group (AAG) as a whole. In terms of the Airport Group, the redefinition of responsibilities has been guided by the Crown Corporation model. A 1988 Departmental report recommends that:

...the AAG's structure, management practices and controls be similar to those of a Crown corporation in that there would be a Board, business accounting and accountability through the business plan and a commercial orientation²

The same report proposes that each MFA be designated a Strategic Business Unit (SBU). This was intended to reinforce the movement - a movement which had been under way since the mid 1980s - away from detailed centralized control of the MFAs.

Table 1

FEDERAL AIRPORT INVESTMENT

Number of Airports:					
Region	Owned & Operated by Fed. Govt.	Owned by Fed. Govt. & Operated by Others	Owned by Others & Operated by Fed. Govt.	Owned & Operated by Others with Fed. Subsidies	Total
Atlantic	15	2	-	16	33
Quebec	9	25	1	10	45
Ontario	12	10	--	2	24
Central	10	23	3	4	40
Western	14	22	2	14	52
Pacific	15	9	6	2	32
Total	76	88	12	50	226

Source: Transport Canada, "AAG Involvement in Airports," (TP8993E), May 31, 1991. Changes up to September 1991 have been incorporated.

Table 2

**SHARE OF TOTAL COMMERCIAL AIRPORT ACTIVITY
HANDLED BY MAJOR FEDERAL AIRPORTS, 1990**

	% of Enplaned Plus Deplaned Passengers	% of Passenger Flights
Toronto	30.5	14.0
Vancouver	14.2	9.1
Dorval	9.7	6.4
Calgary	6.9	4.8
Ottawa	4.1	3.2
Halifax	3.8	3.2
Mirabel	3.7	1.2
Winnipeg	3.4	2.7
Edmonton	3.0	1.6
Sub-total	79.3	46.2
All Airports	100.0	100.0

Source: Statistics Canada, Air Carrier Traffic at Canadian Airports, Oct.-Dec. 1990, Cat. #51-005, March 1992.

Another thrust of the new policy framework is to provide for others to own or operate federal airports. Specifically, this involves:

- the transfer of a number of major federal airports to local airport authorities, which will manage and operate the local airport system on the basis of a sixty-year lease;
- the sale or lease of some federal dependent airports to local governments or the private sector; and
- the involvement of the private sector in financing capacity expansions at major federal airports.

Along with these initiatives, the department has proposed a cost recovery program which is intended to support the move to a greater commercial orientation. According to departmental estimates, new user charges and proposed increases in existing fees would generate an initial increase of some \$40 million in annual airport revenue.

2. The Issues

In his 1990 Report, the Auditor General notes the variety of ways in which the federal government is involved in airports: it operates some; contracts out the operation of others; leases others out for operation - some with and some without subsidy; and has 3 operated by territorial governments under special agreement. Federally owned airports in four cities (Montreal, Vancouver, Calgary and Edmonton) have just been transferred to local airport authorities. In addition, the federal government subsidizes 50 airports owned by others and operates 12 airports owned by others. The result is what the Auditor General described as a "patchwork."³

Different ownership, operating and financing arrangements may reflect a flexible approach in which efforts are being made to accommodate the very different needs and circumstances at various airports. Of more concern is the Auditor General's assertion that the current situation has evolved without "an identifiable pattern or logic." That same criticism, however, could be levelled at many governments. The sense that new and more effective institutional arrangements are required for airports has been widely felt, and has been a source for recent reforms in a number of countries.

In the remainder of this chapter we examine those considerations that should guide the choice of organizational arrangement and we assess the federal government's current policy approach. The starting point is to understand the basis for government involvement in this sector. This is the focus of the next section, in which major attention is given to the question of whether private airport firms would possess inordinate market power. In Section III, the relative advantages of addressing the government's policy objectives through public and private production are considered. There is an effort to distinguish these conclusions that apply to public production in general, from these that apply to the particular form of public production that exist in the

Canadian federal airport sector (although this distinction is, at times, difficult to draw.) Private production in this case refers to the alternatives of a privately-owned airport, and a privately-owned facility subject to government regulation. Private production might also come about from an arrangement whereby the government contracts with a private firm to manage a publicly-owned airport. This is considered in Section IV. Section V looks at the decision to allow private firms to finance, develop and operate Canada's major airport terminals, and Section VI assesses the policy of transferring federal airports to local airport authorities. The chapter's conclusions are presented in Section VII.

II. THE ROLE OF GOVERNMENT

It has long been recognized that government support was necessary for the construction and operation of airports that convey social and public policy benefits. The federal government's initial involvement was in the establishment of emergency landing grounds, and in the construction of a National Defence Airport (St. Hubert) to fulfil Canada's contribution to a system of Empire Air Communications. After the creation of Trans-Canada Airlines in 1937, airport construction became an element of the government's commitment to establishing coast-to-coast air links, which it was hoped would in turn contribute to the broader goal of strengthening national unity.

In the recent period, government support is still necessary for the maintenance of airports in less densely populated communities. At the same time, the opposite concern, that airports will generate excess or monopoly profits, applies in other centres. Studies by Morrison (1983) and Doganis Nuutinen (1983) have found that airports are by and large characterized by constant returns to scale. There is some evidence, however, of economies of scale at small airports which handle less than 2 million Work Load Units per annum (where a Work Load Unit is one passenger or 100kg of freight).⁴ Thus, efficient prices at very small airports will not cover average costs. While, in the absence of congestion, efficient prices at larger airports should not generate monopoly rents, the competitive pressures required to bring about efficient pricing may not exist. We examine this latter issue in more detail below.

Concerns about market power apply not just to airport services; where there is only one airport serving a market, there is a potential for monopoly power to be extended into the provision of carrier services. The concern that restrictions in airport access will threaten airline competition is greatest where carriers themselves operate the airport, but it does not apply only in these situations.

In airports, as in roads, government intervention is also required because of some potentially important externalities. These include the damage airport activities inflict on the surrounding environment. It may be possible for airport owners and neighbourhood residents to work out a solution involving appropriate compensation, but oftentimes, because of the difficulty of organizing those who are affected and the cost of negotiating a mutually satisfactory agreement, government regulation will offer a more

reasonable solution. Government intervention is required, as well, to regulate airport safety, which involves externalities, but also major information problems; because of the difficulties in gathering and assessing the required information, market forces could not be relied upon to provide an appropriate degree of safety even if all costs were internalized.

A further basis for government intervention arises from the desirability of coordinating major, long-term sunk investments. The dangers of uncoordinated investment under these conditions are perhaps best illustrated by the railway overbuilding which occurred in Canada in the early decades of this century. These concerns are not relevant to all airport investment, but they are relevant to major airside developments such as those being proposed for Toronto and Vancouver. It has been suggested that even such major projects can be undertaken incrementally, thereby providing a significant degree of flexibility. But large-scale development has been favoured over step-by-step expansion in Canada - a pattern that may have been further encouraged by the long-term tests incorporated in the federal environmental review process. The runway expansion at Vancouver, for example, is being planned with a view to developments over a 30 year time horizon.

1. The Federal Role

The need for government intervention doesn't necessarily translate into a need for centralized planning and control. Indeed, there are often benefits from assigning responsibilities to a lower authority that can give greater weight to the preferences of the main airport users. These must be weighed against the benefits of centralization where the impact of local or regional decisions spill over beyond the bounds of the jurisdiction, and where there are economies of scale in policy development and administration.

The latter considerations are relevant to air navigation. This is not an issue that lends itself to the expression of regional or local preferences. It is an activity for which there are significant benefits from co-ordination and standardization. Along with the benefits to users from standardized procedures, there are economies in the development of a national set of rules and in the operation of certain forms of air navigation.

In most other policy areas, the justification for a centralized approach is less clear. While there is some interdependency between airports, these are generally similar to those in other markets with substitutes and complements. The underpricing of services at airport A, for example, could encourage increased activity at federal airport B, and reduce demand at substitute airport C. These interdependencies do not in themselves provide a strong argument for a centralized policy approach,⁵ although they suggest that there is a rational interest in avoiding policies that seriously distort airport pricing and investment decisions.

The desirability of investment co-ordination, which was discussed above, does provide a possible argument for centralization. But co-ordination can never be fully achieved since this would require control over investment not only in Canada, but also at competing airports in the northern U.S. The appropriate focus is on co-ordination

mechanisms that can realize the most important benefits in terms of risk reduction, while avoiding the costs of centralization. This is likely to favour a regional over a national approach to airport planning.

Central planning and control would provide additional options for financing the deficit of smaller airports. The required revenue could conceivably be raised through Ramsey pricing whereby prices are marked-up above marginal cost with the mark-ups distributed among services and airports so as to minimize the resulting welfare losses. Ramsey pricing is potentially attractive because of the significant costs in raising the required revenue through the general tax system.⁶ While deficit airports could implement their own Ramsey pricing scheme, this would entail greater welfare losses; there are gains from being able to generate the required revenue from the least elastic services within the airport system as a whole. However, the successful implementation of Ramsey pricing across the airport system would require considerable information and would be costly to administer. In practice, alternative financing arrangements that can be successfully implemented with less information, and that allow the benefits of more decentralized decision-making to be realized, may be preferable.

2. The Market Power of Canadian Airports

Is there reason to be concerned about the potential for the exercise of market power in Canadian markets? Airports provide two types of services, air-traffic services and commercial services, and these involve different considerations. Air-traffic income comes from fees for landing and parking aircraft, and for processing passengers. Commercial revenues come from concessions and land rentals, as well as from payments for any services the airport itself provides directly to passengers. We examine air-traffic services first.

2.1 Air-Traffic Services

Air traffic services are an input into the services produced by air carriers. The elasticity of demand for an intermediate service can be analyzed according to the general rule that

$$E_{ii} = S_i E + E'_{ii}$$

where E_{ii} is the own price elasticity of demand for the i^{th} input, S_i is the cost share of the i^{th} input, E is the price elasticity of demand for the final output, and E'_{ii} is the elasticity of substitution between factors. In the case of air-traffic services, E_{ii} would represent the price elasticity of demand for takeoffs and landings, E would represent the price elasticity for an airline seat, and S_i the share of takeoff and landing fees in total airline costs. E'_{ii} refers to the ability of airlines to reduce their dependence on takeoffs and landings at a specific airport, by, for example, switching to larger aircraft, or, more importantly, substituting an alternative airport.

Gillen, Oum and Tretheway (1986) have made some illustrative calculations of $S_i E$ for aircraft landing fees. Their results, which are reproduced in Table 3, show that

the price elasticity of demand for landings is extremely low for commercial aircraft. While their elasticity estimates were somewhat higher for short-haul than for long-haul flights (mainly because landing fees constitute a higher proportion of costs on short-haul flights), even on very short flights they found that substantial increases in landing fee charges would produce a very slight response. For example, according to the estimates in the table, a 100% increase in landing fees for a 1 hour B-737 flight would result in only an 8% reduction in such flights. The authors explain that "landing fees are simply not important enough to cause airlines to reduce operations in response to even sizeable fee increases" (p. 91).

This type of calculation will result in an underestimate of the overall elasticity of demand for air-traffic services, if the elasticity of substitution (E_{12}) is significant. Starkie and Thompson (1985) emphasize the need to consider the substitutability between airports; if two airports are close substitutes, then an increase in landing fees at one can be expected to have a very significant influence on demand at both airports.

In assessing competition between airports, it's important to distinguish traffic for which the airport is a point of origin or destination (O-D traffic), from traffic for which the airport serves as a connecting point or hub. In the case of O-D traffic, competition is only possible if there are two or more relatively uncongested airports relatively close to the city. In Edmonton, for example, the city-owned Edmonton Municipal Airport has been an alternative to the federally-owned Edmonton International Airport. Most often, however, alternatives do not exist, or those that do exist are very imperfect substitutes. Boundary Bay in British Columbia, and Springbank in Alberta serve a useful role as reliever airports, but for most passengers they are not a viable alternative to VIA and Calgary International Airport. In the Toronto area, Oshawa, Hamilton, Buttonville, and Toronto Island airports have helped to relieve congestion at Pearson, but these are alternatives mainly for commuter traffic on particular shorter routes. Hamilton can handle jet aircraft (although not larger aircraft such as the Boeing-747, DC-10 and L-1011), but its development as an alternative depends on access being improved and concerns about the resulting air traffic control problems (because of its proximity to Pearson) being resolved.

In the case of connecting traffic, there is greater scope for competition. For example, Calgary and Edmonton are possible alternative regional hubs; in its efforts to establish its position as a major hub for Pacific-region traffic, Vancouver must contend with the competition from U.S. airports such as Seattle, Los Angeles and San Francisco, and even the potential competition from Toronto and Montreal (since it's now technically feasible for aircraft to fly non-stop from Pacific-rim countries to central Canada). As the major national hub, Pearson Airport faces competition from Montreal, as well as from a number of northern U.S. centres that could provide an alternative connecting point on transborder and international flights.

TABLE 3

EFFECT OF STAGE LENGTH ON PRICE ELASTICITY OF DEMAND FOR LANDING
(for B737)

(1) Block Hours	(2) Direct Cost of Flight	(3) Total Flight Cost Plus Indirect Cost	(4)* Domestic Landing Charges: Average of Landing Fee and SMC	(5) Share of Landing Fee (4) / (3)	(6) Price Elasticity of Air Travel	(7) Price Elasticity for Landing (5) x (6)
		1.2 x (2)				
1	\$2,311	\$2,773	\$211	0.076	-1.05	-0.080
2	\$4,622	\$5,546	\$211	0.038	-1.10	-0.042
4	\$9,244	\$11,092	\$211	0.019	-1.20	-0.023
6	\$13,866	\$16,639	\$211	0.013	-1.20	0.016

SOURCES: Air Transport World, p.106, January 1986.
Air Services Fees Regulations, Report No. TP2590E, Resource Management Rate Economics Branch, Air,
Transport Canada (September 1985).

* The cost per block hour, U.S.\$1,651 for B737 was obtained from Air Transport World, p.108, January 1986 and was then multiplied by 1.40 to convert it to Canadian dollars. Therefore, our estimate of 1985 cost per block hour for B747 is \$2,311 Canadian.

** A ten-year average (1967-76) of indirect costs for the domestic operations of U.S. trunk and local service carriers was about 20% of total operating and capacity cost (see Oum, Gillen and Noble, 1984).

*** The landing fee is computed as the average of the 1985 domestic landing fee (\$130) and social marginal cost of landing (\$292) during the spring morning peak hour in V.I.A (Table 5.26) i.e. $(130 + 292)/2 = (\$211)$.

Source: Gillen, Oum and Tretheway (1986)

Illustrative Application

Table 4 shows the relative importance of origin-destination and connecting traffic at a number of larger Canadian airports. O-D traffic clearly dominates, and this is so even at important hubs such as LBP and VIA. The latter are not "hubs" in the same sense as some U.S. airports, whose existence is largely dependent on their ability to attract connecting traffic. At Hartsford Atlanta International Airport, for example, O-D passengers are estimated to account for only 30% of total traffic.

TABLE 4
ORIGIN-DESTINATION TRAFFIC
AS A PERCENTAGE OF ENPLANED-DEPLANED TRAFFIC
1989

Calgary	68.8
Dorval	67.6
Edmonton Int.	81.6
Edmonton Municipal	67.4
Halifax	68.5
Ottawa	78.9
Regina	84.0
Saskatoon	82.9
Toronto: LBP	68.1
Vancouver Int.	63.3
Winnipeg	73.0

Source: Compiled by Aviation Statistics Centre, Statistics Canada.

In some situations, it will be difficult to implement separate pricing policies for O-D and connecting traffic. Where there is a mix of these two types of traffic in a given flight, an airport will be unable to fully exploit its market power in relation to O-D traffic.

However, even with respect to connecting traffic there are reasons to question the degree of effective competition. First, some centres are in a highly advantageous position vis-à-vis potential competitors. Pearson's development as the dominant hub was a logical result of its central location in Canada, its proximity to the financial and industrial heartland of the nation, and its ability to serve all markets from a single location (unlike the split operations between Mirabel and Dorval in Montreal). Secondly, the competitive strength of carriers with sophisticated hub and spoke systems combined with the difficulty and cost of refocussing a network from one hub to another will provide existing hubs with a strong advantage, at least over the short and medium term. For example, Calgary's position vis-à-vis Edmonton is considerably strengthened because

it is the western hub and operating base for Canadian Airlines International. Thirdly, competition may be precluded because the potential competitors are under common ownership. The federal government currently owns virtually all the main Canadian airports. When some airports begin operation as Local Airport Authorities (LAAs), the federal government will continue to have a financial interest in these entities since lease payments are to be geared partly to airport revenue. One might expect this to reduce the incentive for federal airports to compete with LAAs, and discussions with Transport Canada officials indeed suggest that such competition is to be discouraged.

Thus, examination of substitution possibilities only slightly modifies the conclusion suggested by the illustrative calculations of Gillen et al. The demand for air services is inelastic and major Canadian airports do possess quite significant market power.

2.2 Commercial Services

Commercial activities are largely undertaken by private firms who operate retail concessions or rent land, office or shop space at the airport. An airport can maximize its commercial revenue by providing individual concessionaires with a monopoly on particular product lines; this increases the value of the franchise, and it will raise the bids the airport receives when franchises are awarded through competitive tender. While some commercial services, such as hotels and car rentals, are subject to competition from off-airport facilities, such competition is limited for most items, including particularly duty-free and convenience goods. The threat of monopolistic pricing exists even if there are a number of separately owned or operated terminals at an airport; gate allocation and flight schedules discourage the passenger movement that is necessary to provide effective competition between retail outlets in different terminals.

Evidence from the UK on this issue is instructive. The British Airport Authority (BAA) has long had a practice of cross-subsidizing its air-traffic services with the profits generated from its commercial services. The Monopolies and Mergers Commission (MMC), which examined the commercial services at BAA in 1985, expressed concern about the inadequate degree of competition, although this was tempered by a recognition that terminal space is limited and that there is therefore a need to balance the benefits of competition against the gains from providing passengers with a diversity of services. The MMC warned that safeguards were needed to prevent BAA from exploiting the captive nature of its concessionaires' market, and that this would be especially important after BAA was privatized. Starkie and Thompson (1985), who examined BAA at about the same time, found similar evidence of limited competition. It was only with respect to services to airlines (i.e. ground-handling, fuel and flight catering) that there were a significant number of competing suppliers. Passenger services at BAA terminals were found to be subject to little or no competition.

While at major federal airports in Canada profits on commercial activities have similarly been used to offset losses on air-traffic services, there has not been an incentive to fully exploit commercial revenue sources.⁷ A better indication of the potential

for the exercise of market power at major Canadian airports is provided by the practices of the private developer of Terminal 3 at Pearson. Recent newspaper reports indicate the relatively high rents at Terminal 3:

Sources say shopkeepers at Terminal 3 pay basic annual rents of \$200 a square foot, plus as much as \$36 a foot in common area maintenance charges, as well as percentage rents ranging from 15 to 23 per cent of the store's total sales. At a regional shopping centre, by contrast, basic rents run from \$40 to \$60 a square foot. The mall owner's cut of sales is typically 6 per cent.⁸

High rents were negotiated based partly on the expectation of a high traffic flow, and the failure of this traffic to materialize over the first year has been a major concern to the retailers. But it would also appear that high rents reflect the benefits of a captive market, and of exclusive concessions. Newspaper reports suggest that the private developer of Terminal 3 has attempted to maximize rental revenue by awarding exclusive concessions to some retailers.⁹

Of all the passenger services at a terminal, demand is most inelastic for the terminal's main service which is to connect passengers with flights. Private airport operators who are allowed to levy a terminal access fee or facility charge are in a position to exploit their market power in this area. While passenger facility charges have only existed at a few Canadian airports, and they could not be levied by airport authorities in the U.S., in both countries there is now significant interest in tapping this potentially important revenue source.

Therefore, there is valid reason for concern about the market power of airports with respect both to air-traffic and commercial services. The relatively captive nature of the market - for both aircraft and passengers - distinguishes the provision of airport services from other economic activities, and provides a rationale government intervention.

III. PUBLIC VS PRIVATE PRODUCTION

1. General Considerations

We begin our consideration of the relative advantages of public and private production by looking at whether the policy objectives identified in the last section pose any special contracting problems. Are the transaction costs associated with the negotiation and execution of an arrangement with a private firm such that public ownership may offer potentially significant economies? We then examine available information pertaining to allocative and productive efficiency under public and private ownership. While particular attention is given to the performance of Canadian federal

airports, there is recognition that this reflects the influence not only of public ownership, but also of a number of special features of federal airport operation.

1. Transactions Costs

Of the policy objectives identified in Section II, most do not give rise to problems of the sort that would cause one to question the basis for private ownership. Public safety concerns can be - and are - effectively addressed through the regulation of private providers of transport services. Environmental concerns can be met through the establishment of needed controls and review processes for major private sector investment projects. Nation-building is somewhat more problematic in that it might be difficult for the government to define this objective with the precision that is necessary to guide private investors, or to direct a board or agency that has responsibility for reviewing private sector investment proposals. But this problem was more relevant to Canada's earlier efforts to develop a national airport system, than to current efforts to efficiently manage that system. It is not an issue that in itself weighs significantly against the privatization of Canadian airports.

Transactions costs are an important issue when it comes to addressing concerns about the market power of airports, and to developing means to sustain uneconomic airports that convey significant social benefits. As in roads, the source of the problem is the need for long-lived investment. Private investors require a long-term arrangement, consistent with the long-life of the capital. But in an uncertain environment, long-term contractual arrangements that incorporate the required degree of flexibility are difficult and costly to negotiate and enforce.

In the case of smaller airports that are subject to economies of scale, the challenge is to supplement the return provided by the market without providing private operators with excess profits or with scope for non-competitive wage payments or operating waste and inefficiency. When money-losing federal airports are transferred to private owners, the government can ensure that payments to the new private owners do not exceed the existing level of government subsidization. The latter provides an important benchmark by which to assess the appropriate degree of public support. But this is likely to become increasingly unreliable over time as changes occur in the demand and in the supply of the airport's services. Even if such changes could be foreseen it would be difficult to design and enforce an agreement that incorporated incentives for efficient performance by the private owner. In practice, agreements will almost inevitably have to be adjusted over time. And in the resulting renegotiations, the private operator will have the advantage because of the government's commitment to maintaining the airport, and the private operator's superior knowledge of the operating costs and potential.

Instead of offering subsidies, the government could attempt to sell the airport at a price that is expected to provide private investors with a reasonable return. But where this requires that airport lands be sold below their market value, private investors will have no incentive to sustain the airport as an operating entity. While restrictions on the disposal of airport lands can be incorporated in the sales agreement, it

will be difficult for the government to ensure that the airport is not run down through inadequate maintenance and repair, and poor service performance. It would be in the self-interest of private owners to discourage use of the airport and thereby to weaken the case for maintaining it as an operating facility.

Moreover, it is likely to be difficult for the government to detach itself from a facility. So long as there is perceived to be a public interest in maintaining a particular airport, the government will be under pressure to provide support if the private owners run into financial difficulty. In some cases, the nature of the political pressures may be such that even the suggestion the government is detaching itself from a facility cannot be made credible. Hence, there may be considerable scope for the private owners to engage in opportunism to increase their gains from trade.

Therefore, transactions cost considerations, suggest that, with private ownership, the achievement of certain policy objectives will be problematic. Especially complex contractual issues arise in connection with the government's responsibilities for supporting commercially non-viable airports, and for controlling the exercise of market power by private airport operators.

The second issue, at least, can be addressed by introducing regulation. The relevant question is, then, whether efficiency - including both allocative and productive efficiency - is best achieved through public production or private regulated production. We examine this issue in the following sections.

2. Allocative Efficiency

Landing fees at Canadian airports, which are based primarily on aircraft weight, depart substantially from an optimal schedule of charges that reflects the marginal social costs of aircraft activity. As Gillen et al (1990) point out, the current approach to airport pricing in Canada is subject to three principal criticisms: (1) the same fee schedule applies to all airports within a group (i.e. Group I, II and III airports) although there are substantial cost and demand differences among these airports; (ii) the influence of aircraft activity on other components of the airport besides runways - most notably terminals - is ignored; and (iii) the cost of noise and congestion is not taken into account. The latter is a particularly important omission for Canada's major airport, Pearson, where the costs of congestion and delay are estimated to be substantial.¹⁰

Gillen and Oum (1992) look at the implications of introducing efficient pricing subject to a cost recovery constraint at selected major and small Canadian airports. They find that at Pearson, the example of a major airport, the establishment of peak period takeoff and landing fees allows the airport to generate a surplus on runway operations. Efficient pricing would result in lower fees for large aircraft, but in substantially higher fees for small aircraft. At small airports, efficient prices would again lead to a substantial increase in fees for smaller aircraft (i.e. piston, turboprops), but, since there is little congestion, peak period prices do not yield much additional revenue. Gillen and Oum find that at a small airport such as London, efficient prices recovered less

than half airfield costs. It was estimated that Ramsey pricing to achieve cost recovery would require landing fees for jet aircraft to be almost double their efficient level (based on estimated marginal costs), and fees for turboprop aircraft to be marked-up by some 50 percent.

If we look at the major example of a private airport, BAA, we find that, although the pricing structure that has been adopted is somewhat more sophisticated, it is also a long way from an optimal scheme. BAA imposes aircraft movement fees, aircraft parking fees and passenger fees. These vary by airport and are increased during peak periods. But BAA's overall traffic charges are well below efficient short-run marginal social costs. While BAA's intention has been to apply long-run marginal cost pricing, studies suggest that traffic charges have been below this benchmark.¹¹

This system of charges exists under a system of price regulation known as RPI-X; allowed increases in fees are based on the increase in the Retail Price Index (RPI) less some amount which, for the initial 5 year period, was set at one percent. While, as compared to traditional rate-of-return regulation, RPI-X can provide greater incentives to improve productivity, it does not eliminate the incentive for the regulated firm to engage in various forms of strategic behaviour. For example, the pricing formula applies to average revenue per passenger; BAA can therefore increase profits by attracting a greater proportion of traffic with low marginal costs. In addition, only airside services are regulated. The corporation thereby has an incentive to direct its investment toward its highly profitable commercial sector rather than its regulated air-traffic sector.¹²

These results are consistent with the general findings cited in the previous chapter which suggest that allocative efficiency is more a function of government or regulatory objectives than of public or private ownership. The inefficiencies at BAA are due not to private ownership, but to the establishment of a regulatory regime that perpetuated the pricing inadequacies that existed when BAA was a public corporation.¹³ Similarly, allocative inefficiency in Canada under public ownership can be mainly attributed to governments' reluctance to substantially alter airport pricing structures.

Having recognized the critical influence of public policy objectives on allocative efficiency, it's necessary to consider that public policy objectives may in turn be influenced by the decision to maintain an activity in public hands. Where policy makers control investment decisions they may use their authority to pursue a number of objectives, including some that can be more efficiently pursued by other means. There are some indications that airport investment decisions have been influenced by the imposition of such "additional" objectives. For example, many smaller centres have terminals with considerable excess capacity. Runways designed to accommodate jet aircraft can be found at a number of small centres that are only served by commuter planes.¹⁴ The Air Transport Association (1991), has found that Transport Canada's criteria for the justification of control towers are satisfied at only 33 of the 60 airports at which towers exist (Table 6).

It is also important to give attention to another allocative issue, one that doesn't arise with roads: in the case of airports, users of the infrastructure have had a

significant direct role in supply decisions. The influence of airlines has been particularly important in the U.S., where airports operated by municipalities and port and airport authorities have been driven to find mechanisms to meet their funding requirements. One result has been the adoption of the "residual" cost financing at some airports. Here the major airlines assume the airport's financial risk by agreeing to pay any costs of running the airport that are not allocated to other users or covered by non-airline sources of revenue. Major airlines have also entered into long-term agreements for the lease of required facilities such as ticket counters, baggage check-in areas, passenger hold rooms, luggage claim areas, and enplaning/deplaning gates. Most of the gates at the largest U.S. airports are under long-term exclusive-use leases under which the lessee has the sole right to use the facility¹⁵ (see Table 6). A further channel of carrier influence has been Majority-In-Interest (MII) agreements. These provide the major airlines at an airport with the right of veto over major capital investments in return for airlines' guarantee of airport debt.

Table 5

**Control Towers Which Do Not Meet Transport Canada
Criteria for Establishment**

Grande Prairie	Springbank	Penticton
Windsor	Thompson	St. Andrews
Kamloops	Fredericton	Waterloo-Guelph
Boundary Bay	Fort St. John	St Honore
Oshawa	Langley	Sydney
Saint John	Charlottetown	St. Jean
Lethbridge	Baie Comeau	Brandon
Val d'Or	Villeneuve	Castlegar
Whitehorse	Pitt Meadows	St. Catherines

Source: Air Transport Association of Canada, The Response of the Commercial Industry to the Cost Recovery Proposed by Transport Canada, February 1, 1991.

These arrangements have created major barriers to entry for airlines⁶ and significantly distorted the supply of airport services.¹⁷ There is increasing recognition that such practices, which arose under regulation, are inappropriate in a competitive airline industry. U.S. airports have recently been trying to increase their control over facilities by moving toward shorter-term leases, by including recapture provisions, in their leases with airlines, by rejecting MII clauses, and by switching from residual to compensatory financing (under which the airport operator assumes responsibility for covering airport costs).

Although most of the significant U.S. airports are publicly-owned, one might expect that the financial pressures which caused them to seek airline backing and support are those to which private airports are particularly vulnerable. But even publicly-owned airports with public financial support are not immune from these problems. In Australia, there was concern that the long-term leases the government signed with Ansett and Australian Airlines would reduce the opportunity for new airline entry (Mills, 1989). Canada has also engaged in the practice of signing long-term leases that provide individual airlines with control over gates and other terminal facilities at major airports. New carriers have often had to sublease facilities from incumbent carriers to gain market access. The increased influence of major carriers has resulted in part from their major contribution to the financing of terminal modifications and expansions. For example, Air Canada has financed most of the recent modifications to Terminal 2 at LBP. As with most of the influences on allocative efficiency, ownership is not the only, or necessarily the most important, underlying factor.

Table 6

Total Domestic Gates and Leased Gates by Airport Type and Lease Type

				Leased Gates		
		Total Gates			Percentage	
Size of airport	Number of airports	Number	Percent	Number	Exclusive-use	Preferential-use
Large	27	2,036	65%	1,795	90%	10%
Medium	39	1,093	35%	943	77%	23%
Total	66	3,129	100%	2,738	85%	15%
Airport market				816	89%	11%
Concentrated	14	894	29%	816	89%	11%
Unconcentrated	52	2,235	71%	1,922	84%	16%
Total	66	3,129	100%	2,738	85%	15%

Source: U.S. General Accounting Office, Airline Competition, GAO/RCED-90-147, August 1990.

3. Productive Efficiency

The general evidence cited in the previous chapter suggests that, in terms of productive efficiency, there is little basis to presume in favour of either of a public firm or a private regulated firm. Are there any special factors that would affect the relevance of those conclusions to the airport sector?

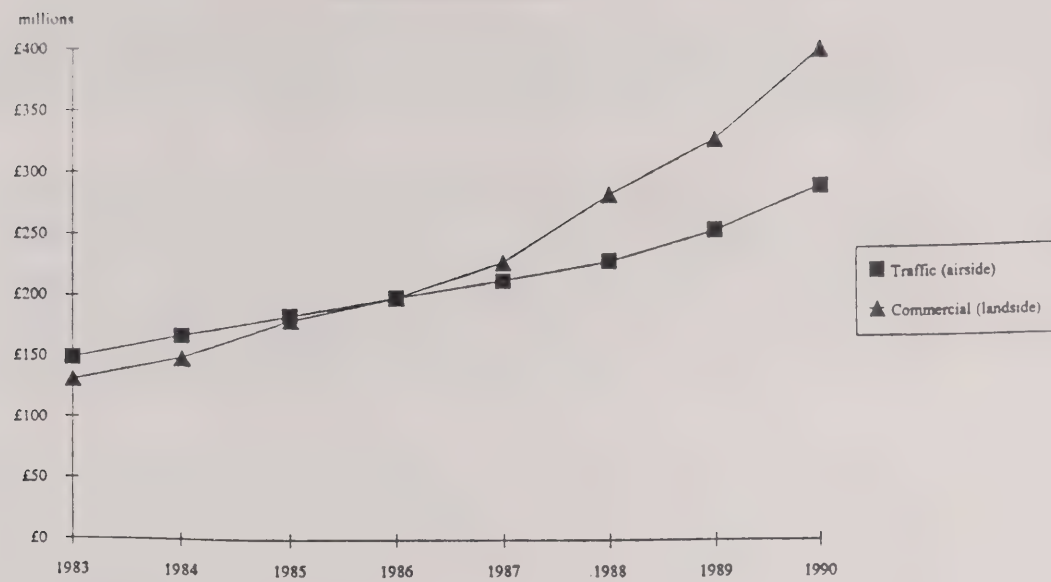
In assessing the results of BAA's privatization, it is necessary to consider that BAA has been subject to a system of price-cap (i.e. RPI-X) regulation, which differs from the more traditional rate-of-return regulation to which most of the evidence on regulatory performance cited in the last chapter applied. Since RPI-X allows some of the productivity gains above those negotiated over a fixed period to be appropriated by the firm, one might expect the incentives for efficiency improvement to be somewhat greater than under rate-of-return regulation. As Beesley and Littlechild (1989) contend the productivity gains under RPI-X should be particularly significant at the time of privatization.

BAA has been successful in generating increased profits - so much so, that the Civil Aviation Authority in the U.K. has argued that an appropriate return on capital would be achieved by increasing X in the RPI-X pricing formula to eight over the next five years. To provide the required investment incentive, the CAA eventually agreed to a formula in which X declines from eight percentage points in the first two years, to four in the third year, and one in the fourth and fifth years. A strong growth in commercial revenue has been the primary factor behind BAA's strong financial performance (Figure 1). As Poole (1991) shows, BAA's labour productivity, measured by passengers per employee, has also increased - although the improvement after 1987 was less impressive than that over 1982-86 when BAA was still under public ownership (Figure 2).

These results are far from conclusive. Figure 2 depicts partial productivity, as opposed to the more desirable measure of total productivity (i.e., the ratio of total physical output to total physical input). And, even as a measure of partial productivity, it may be misleading to the extent there have been important changes in the mix or quality of services provided by BAA over the period.¹⁸ Moreover, as we noted in the last chapter, the growth in commercial revenue cannot be interpreted strictly as indication of greater private sector efficiency. The decision to privatize BAA was accompanied by a decision to allow fuller exploitation of the airport's commercial revenue potential. An increased emphasis on revenue generation can also have a major impact on the performance of publicly-owned airports. Australia's publicly-owned Federal Airport Corporation (FAC), which has responsibility for the country's major airports, is devoting a major part of its efforts to increasing revenue from non-aviation sources. Even at federally-operated airports within Canada, there is some indication that managers are beginning to more actively pursue opportunities for increased commercial and industrial development on federal airport lands.¹⁹

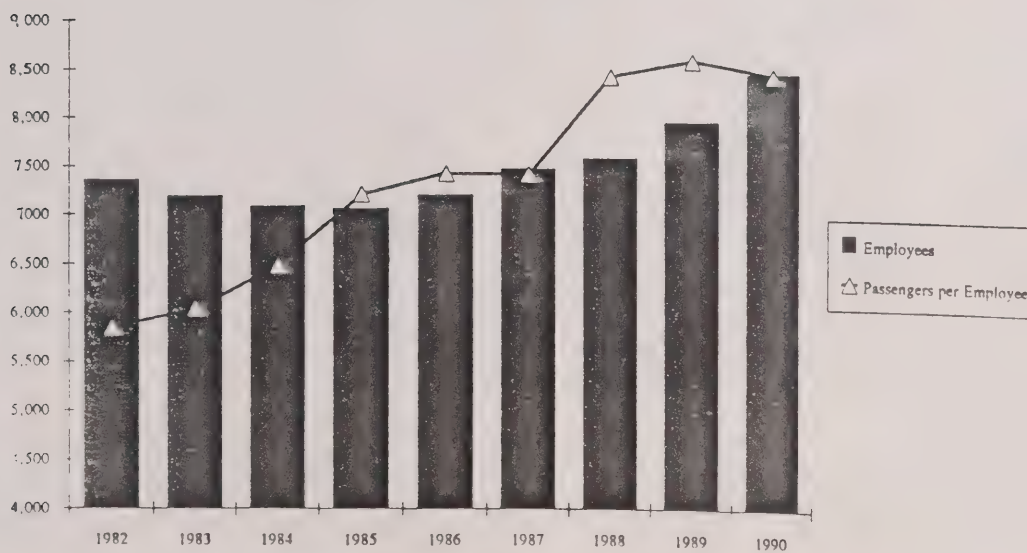
In addition, a longer-term perspective is particularly important in assessing the effects of RPI-X. As Vickers and Yarrow (1990) point out, the incentives for cost efficiency are likely to deteriorate substantially as the time for regulatory review draws near, and the firm must allow for the possibility that a high rate of return will result in an

Figure 1
BAA REVENUE SOURCES



Source: Poole (1991)

Figure 2
BAA WORKFORCE and PRODUCTIVITY



Source: Poole (1991)

unfavourable regulatory decision. One might expect that BAA will give serious consideration to the results of its first regulatory review, in planning its strategy over the next five years.

Performance indicators similar to those gathered by Poole (1991), have been used to quite different effect, namely to show that BAA's performance is inferior to that of a publicly-owned and locally-operated airport. In a presentation at the 1990 Conference of the Transportation Research Forum, Louis Turpen, the Director of San Francisco International Airport (SFIA), showed that, in terms of revenue per employee, passengers per employee and cost per enplaned passenger, SFIA's performance over 1990 was far superior to that of BAA. While such results raise some additional questions about BAA's experience, it must be recognized that problems arising from differences in mix and quality of output are likely to be even more significant in comparing different airports than in comparing a given airport over time. For example, BAA has a far higher proportion of international passengers than SFIA and the services provided to international passengers tend to be more costly than those provided to domestic passengers.

One of the few attempts to address the problems in measuring and comparing airport performance is a study of European airports by Doganis and Graham (1987). This study is of added interest because of recent efforts of Transport Canada researchers to extend the analysis to major Canadian airports. Doganis and Graham focus on unit costs or total costs per work load unit (WLU), with the latter being equivalent to 1 terminal passenger or 100 kgs of freight or mail. WLUs are an imperfect measure of airport output, but Doganis and Graham find that their results in terms of airport rankings are not significantly affected by the use of alternative definitions of airport output. The study also attempts to adjust for differences in the activities performed by the airports under examination. Costs per WLU are calculated excluding those activities performed directly by the employees of some airports but not others: air traffic control; security; handling of aircraft, passengers, baggage and freight; and commercial activities.²⁰

The results of the analysis of unit costs incorporating the extension to major Canadian airports are provided in Table 1. The most robust results relate to the ranking of airports, but even here the findings must be interpreted with a sensitivity to the factors affecting airport costs that could not adequately be allowed for in the measure. Doganis and Graham examined a number of such factors and find that there is a significant positive relationship between unit costs and the proportion of international passengers, and a significant negative relationship between unit costs and the degree of capacity utilization. These factors must be considered in interpreting the relatively favourable performance of Pearson and the very poor performance of Mirabel. The other Canadian airports included in the analysis fall somewhere in the broad mid-range between the highest cost and lowest cost European airports.

TABLE 7
COSTS PER WLU IN 1983 \$'s

AIRPORT	TOTAL COSTS PER WLU	ADJUSTED COSTS PER WLU	OPERATING COSTS PER WLU
MIRABEL	33.62	32.38	13.66
Vienna	18.22	11.78	9.45
Rome	17.67	6.44	5.46
Milan	16.22	6.48	4.46
Frankfurt	13.75	10.14	6.72
Birmingham	12.40	7.79	4.74
Dusseldorf	11.97	6.33	4.77
Manchester	11.58	6.70	5.70
East Midlands	10.79	6.33	4.63
CALGARY	10.77	9.46	4.76
Dublin	10.62	7.18	5.86
HALIFAX	10.45	8.58	5.80
EDMONTON	10.34	8.90	5.68
Glasgow	9.34	6.53	4.44
Amsterdam	9.29	9.01	5.96
Basel-Mulhouse	9.21	8.14	6.44
WINNIPEG	9.16	6.94	5.28
Lisbon	9.16	8.71	4.20
OTTAWA	9.00	6.72	5.04
Heathrow	8.21	6.86	4.59
Gatwick	7.88	6.73	4.01
DORVAL	7.70	6.69	5.06
Belfast	6.72	5.55	5.18
Geneva	6.64	5.72	3.81
Bordeaux	6.22	5.53	3.44
VANCOUVER	6.03	5.14	2.99
Jersey	5.85	2.87	2.20
Stockholm	5.70	4.92	2.15
PEARSON	5.68	5.13	3.13
Marseilles	5.37	5.12	3.33
Copenhagen	4.68	3.68	2.48
Nice	4.42	4.13	2.90
Nantes	3.55	3.40	2.53
AVERAGE	9.95	7.45	4.87

Notes:

- (1) Based on 1984 data for the Canadian airports.
- (2) Adjustments have been made by deducting all costs associated with ATC (security, handling and commercial activities are not included in the financial statements).
- (3) Operating costs exclude ATC and capital charges.

Source: Unpublished Transport Canada study updating Doganis and Graham (1987).

While all of the airports in the sample are under public ownership, the form of organization varies considerably. Some of the airports are operated by semi-autonomous companies that bear many similarities to private corporations. The overall results of the study would seem to suggest that good performance is compatible with quite different organizational arrangements. The lower cost and seemingly more efficient airports include Copenhagen and Stockholm, which are operated by a department of the central government, and the airports in France (Marseilles, Nice and Nantes), which are largely operated by others on a concession basis for the central government. But it would be wrong to attach much significance to this finding. What works in Scandinavia, for example, may be totally inappropriate in other countries with more decentralized systems of government and with airport networks which include a number of major facilities.

One characteristic that seems to distinguish the high-ranking airports is their greater tendency to contract out rather than to perform specific activities on their own. Doganis and Graham note that some airports, including Copenhagen, Marseilles, Nantes and Nice "almost play the role of a landlord with very little participation in most of the activities." On the other hand, in airports with relatively high unit costs such as Dusseldorf, Frankfurt, Milan, Rome and Vienna, airport employers have been heavily involved in directly servicing aircraft and passengers. Most of the activities undertaken within an airport can be efficiently contracted out; for example, security services, maintenance, cleaning, commercial services, and aircraft and passenger handling do not give rise to the need for large-scale specialized investment, nor do they present any obvious difficulties of contract specification and enforcement.²¹ The results of the airport study are thereby consistent with some of the evidence cited previously which pointed to the gains from injecting competition into activities that are amenable to competitive contracting.

Concerns about the incentives for efficient performance under regulation, combined with the indication that many of the benefits of private production can be achieved through contracting out suggest that, in airports, as in other monopolistic sectors, the scope for efficiency gains from privatization per se is limited. However, in applying this general conclusion there is a need to consider a few issues that are particular to the situation at Canadian airports. First, the performance of federal airports has been hampered by restrictions contained in federally-negotiated labour agreements. This partly accounts for some of the reported inefficiencies of federally operated airports with respect to specific functions. For example, in his 1985 report, the Auditor General compared facility maintenance at three federally operated airports and three comparable U.S. airports, and found manpower requirements at the U.S. airports to be 40% lower. Whereas employees at U.S. airports served a variety of functions, Canadian workers were hired for specific maintenance functions and this resulted in both greater requirements and lower employee utilization. Contracting out can offer significant savings in such circumstances where full-time employees are under-utilized, as has been shown by the experience of some non-federally operated airports.²² Federally owned and operated airports have not fully taken advantage of contracting and operating and maintenance activities.

Secondly, smaller federally owned and operated airports have tended to be subject to relatively high operating standards and safety requirements. For example, to comply with departmental emergency response requirements, even the smallest federally-operated airports must have Emergency Responses Services (ERS) available on-site. ATAC (1991) has determined that if Canada was to adopt the same size threshold as the U.S. and Australia, ERS would be eliminated from a large proportion of current sites. The same document claims that, according to Transport Canada's own benefit/cost calculations, ERS is justified at only 7 sites. To the extent that ERS requirements are indeed excessive (based on their net benefits), then they do constitute a form of inefficiency. The higher cost of providing crash, fire and rescue services at federally-operated airports than at U.S. airports, as indicated by the Auditor General (1985), cannot be completely explained away by the higher quality of emergency readiness at the Canadian airports.

The impact of ERS requirements on smaller federally-operated airports is illustrated in a study by Sypher:Mueller (1991) comparing Yarmouth, a federally-operated airport, and Oshawa, a non-federally-operated airport with similar E/D passengers. While Oshawa relies on the local fire department and therefore has no ERS costs, the expenses associated with maintaining on-site ERS account for approximately one-third of Yarmouth's \$700,000 deficit. The federal government has indicated that it intends to establish ERS requirements for all Canadian airports with scheduled commercial service. In this case the establishment of inappropriate federal standards would increase operating costs at all smaller airports, including those that are privately owned and operated.

4. Federal Airport Operation

The sources of inefficiency that have been identified at Canadian airports reflect more upon federal airport operation than upon public ownership. The failure to contract out functions at smaller airports would be of less concern if full-time employees were not being significantly underutilized. The latter is mainly a result of the restrictive work rules that have emerged out of centralized bargaining between the federal government and public sector unions.

The overinvestment in smaller federal airports, and the existence of stringent operating standards are the expression of an implicit policy of promoting relatively high minimum service standards at federal airports. As in other areas of national policy, there is an emphasis on reducing disparities in service among regions and communities. It is another example of the pressures towards equalization that exist in federal systems. While this suggests that the federal government's approach to small airports might be seen as a form of redistribution in which there are very high weights attached to the benefits going to small communities - and not as a cause of inefficiency, there are two problems with the interpretation. First, there are other more direct and less costly ways to achieve the desired transfers to residents of these communities. Secondly, it would appear that the particular policy objectives arose as a consequence of federal airport operation. In other words, federally-owned and operated airports have not been simply instruments of public policy; they have also helped to shape the government's

policy agenda. Under federal operation, new service demand arose, and also new opportunities to establish high quality facilities that could have certain symbolic value. At the same time, the possibility of implementing a system of cross-subsidization in which there would be no budgetary "tracks," reduced the political costs of satisfying such demands. As a consequence, costs arose under federal operation that wouldn't have arisen under an alternative ownership and organizational arrangement.

Federal operation has also resulted in relatively high overhead costs. Hamilton (1991) estimates that the overhead burden associated with maintenance of Transport Canada headquarters adds an additional 16% to the operating and maintenance costs of MFAs. This is in addition to on site administration costs averaging 19% of operating and maintenance costs. These numbers could reflect the high administrative costs of a departmental structure, or diseconomies in the operation of more than one airport. In their study of BAA, however, Sharkie and Thompson (1985) found that airport takeovers caused head office costs to grow in proportion to output, suggesting that the high overhead costs of Canadian MFAs are due to their being a part of a federal departmental structure.

5. Conclusion

The focus of this section has been on those policy objectives which are difficult to address when airport services are provided by private firms. Where the issue pertains to the support of commercially non-viable airport services, the extent of these transaction difficulties is such that public production is likely to be preferable in most circumstances. Where the policy requirement is to control the exercise of market power, the choice is less clear; production by a private firm subject to regulation is a feasible alternative to public production.

Consideration of the relative efficiency of public and private airports has highlighted the important influence of factors other than ownership. Allocative efficiency depends on the pricing and investment objectives of government and regulatory boards. It also depends on whether airports are constrained because of their financial reliance on a few major airlines. While the latter is probably a greater concern with private ownership, the problem can and does exist with government-operated airports.

In terms of productive efficiency, the available information does not suggest that the performance of regulated private firms is inherently superior, but it does point to a number of factors that can greatly undermine the efficiency of public airports. Performance will suffer where: the centralization of administrative functions results in high overhead costs; labour inflexibilities exist due to the provisions of collective agreements and a failure to take advantage of contracting opportunities; and airports become a vehicle to pursue other objectives that are more appropriately addressed through other means. There is some evidence that federally-operated airports are subject to each of these problems.

IV. THE CONTRACTING OUT OF AIRPORT MANAGEMENT

Can the gains that are available from the contracting out of many aspects of airport operation individually be augmented by the contracting out of airport management itself? Or, alternatively, is a management and operation contract with a private firm more likely to raise problems akin to those which would be involved with privatization of an airport?

Under a management contract, the government typically retains planning responsibilities, which include control over the price and quality of airport services. Hence, concerns about monopolistic pricing that arise in the case of privatization are not applicable. Moreover, since large scale, long-lived investment is not entailed, the uncertainties and risks that exist when there is a need for the two parties to make a long-term commitment can conceivably be avoided. Through periodic negotiation it should be possible to adjust the contract to take account of unexpected cost increases, changes in government objectives for the airport, or information suggesting that one of the parties has not lived up to the terms of the agreement. At the same time, contracting out offers the potential for injecting competitive incentives into airport management itself. So long as firms must indeed compete both to initially obtain a contract and then to renew it, they will be under pressure to provide a high quality of service, to reduce their costs and to pass the resulting efficiency gains on to the federal government.

The government has had some experience with management contracts. Although at some of the airports in Table 8 the AAG has in fact retained major management responsibility, the list includes a number of airports in which the entire operation has been contracted out to private firms. Operating costs tend to be lower at these privately managed airports than at comparable federally-operated airports.²³ While some of the cost differential is attributable to higher standards at federally-operated airports (including particularly higher ERS requirements), reports by those who have looked more closely at particular airports suggest that contracted airports do utilize resources more efficiently.

Especially instructive is a recent study by Hickling (1990), which compares performance at two federally-operated airports, Quebec and Kuujjuaq; at a federally-operated airport staffed by employees provided by a private contractor, Iqaluit; and at two airports managed by a private contractor, Kenora and Resolute Bay. The two privately managed airports were found to have substantially lower costs. This was largely attributed to the increased freedom and flexibility of private managers who were able to achieve much fuller utilization of labour. The advantages of simply using private sector employees as at Iqaluit were far less obvious. While private workers are more flexible than unionized public sector employees, those workers supplied by a contractor who has no responsibility for performance results are likely to be wanting in skill and experience. A contract simply relating to employment could conceivably result in performance inferior to that at federally-operated airports.

The Hickling study provides a number of examples of the versatility which allows resources to be more fully utilized at contract-run airports. Some functions which are carried out by separate individuals at federally-operated airports are combined at Kenora and Resolute Bay. For example, the chief fireman at Resolute Bay is also the head mechanic. Heavy machine operators at Kenora also have responsibility for machine maintenance. Specialized tradesman, such as plumbers and electricians, are not kept on staff but are hired as needed. During slack periods the private contractors could utilize their employees outside the airport. At both airports opportunities were also identified to more fully utilize airport equipment if this had been owned by the contractor rather than Transport Canada. For example, snow removal equipment could be employed off the airport site, and it could be adapted for construction purposes during the summer.

It is likely that many of these gains could be achieved by contracting out particular functions, as opposed to contracting out the overall management and operation of the airport. By contracting for specific services, airport managers can overcome inefficiencies arising from their inability to fully utilize machinery or specialized workers, and they can avoid those costs arising from the restrictive working conditions in agreements with unionized airport employees. The Hickling study contends that there are some additional benefits from contracting out the overall operation of the airport. In particular, it is claimed that a single contractor is better placed to transfer resources into and out of the airport in response to changing requirements. This advantage would not exist if there were well developed markets for each of the individual services an airport performs, and if airport managers had a strong incentive to pursue the efficiency gains from the contracting out of specific activities. The conclusions of the Hickling study may reflect inadequacies in these two areas.

Table 8

**Federally-owned Airports
Operated by Management Contract***

Cambridge Bay, Northwest Territories

- Fred H. Ross and Associates Ltd.

Castlegar, B.C.

- Pacific Building Maintenance

Hope, B.C.

- Regional District of Fraser-Cheam

Iles-de-la-Madeleine, Quebec

- Construction Edec Ltd.
(Operation is shared between the AAG and the contractor)

Iqaluit, Northwest Territories

- Best Cleaners & Contractors Ltd.
(Operation is shared between the AAG and the contractor)

Kenora, Ontario

- Jarzab Enterprises Ltd.

North Battleford, Saskatchewan

- The City of North Battleford
(The AAG shares ownership of airside with the City. The City leases its property to the AAG which in turn issues a management contract to the City for the operation and maintenance of the entire site.)

Red Lake, Ontario

- The Corporation of the Township of Golden

Resolute Bay, Northwest Territories

- Tower Arctic Ltd.

Sarnia, Ontario

- Huron Aviation Ltd.

Schefferville, Quebec

- Les Transport Bravo Inc.

St-Leonard, New Brunswick

- La Commission de l'Aéroport Regional du Nord-Ouest du Nouveau-Brunswick Ltée.

Swift Current, Saskatchewan

- Randy Barlow

Yorkton, Saskatchewan

- Jerry Bulitz O/A Behr Investments Corporation

* The contractors are indicated under the name of the airport.

However, caution should be exercised in attempting to transfer the experience of Kenora and Resolute Bay, two very small facilities,²⁴ to larger airports. Competitive tendering, which is required for the government to realize the savings from the contracting out of airport operations, is more difficult to institute at large airports. There are few private companies with the resources and expertise to assume overall responsibility for the operation of a major airport. Even for small airports there are a limited number of companies that could bid for a contract which required the provision of all machinery and equipment as well as manpower. Moreover, although competition may exist at the initial bidding stage, it is likely to be very difficult to sustain competition when the operating contract at larger airports comes up for renegotiation. The specific knowledge and experience gained by the winner of the initial contract will place him in a highly advantageous position as compared to any potential competitors.²⁵ This problem will exist at all airports, but it can be expected to increase as the scope and complexity of the airport operation itself increases.

At larger airports, there is also likely to be a greater requirement for the government to supplement its review of performance criteria with the direct on-site monitoring of activities. Some direct monitoring will be required to ensure that the contractor is adequately maintaining government-owned machinery and buildings. This is particularly so at major airports where inadequate maintenance leading to more rapid asset depreciation can entail substantial costs. But, with on-site monitoring, the government is partially duplicating the supervisory activities the contractor must himself undertake. This duplication would not exist in the absence of contracting, and it undermines the advantages of contracting out the overall operation of the airport.

Operating contracts are not suitable for all airports, but they offer the prospect of significant efficiency gains at some smaller facilities. In addition, contract-run airports provide federal administrators with a useful yardstick by which to gauge the performance of comparable federally-run facilities. Given a suitable monitoring and control regime, these demonstration effects are an important benefit from the contracting out of airport operations.

V. PRIVATE FINANCING OF AIRPORT TERMINALS

Do the concerns raised with respect to private sector financing of airports apply equally to the case of airport terminals? And, do they apply to the particular form of privatization that occurred at Pearson's Terminal 3 and that is being considered for Terminals 1 and 2, whereby a private developer finances, designs, constructs and manages the terminal facility under a development and long-term lease agreement with the federal government?

In so far as terminal development requires a major investment in specialized assets, the federal government and the private investors are inevitably "locked-in" to a long-term agreement which is subject to the sorts of risk we discussed previously. One might expect that the degree of uncertainty, and hence the extent of risk, would be lower in an agreement pertaining to terminals than in an arrangement relating to the airport as a

whole. For one thing, terminal agreements do not present the liability issues that arise in connection with aircraft maintenance and operation. In airport agreements, developments affecting the cost of risk premium borne by each of the parties are potentially a major source of ongoing concern and dispute.

Nonetheless, terminal agreements are subject to many forms of uncertainty (some of which are analogous to those applying to road agreements and discussed in the last chapter). In particular, private developers must contend with uncertainties relating to those public policies that have a direct and important influence on terminal activity. These include government policies with respect to runway investment and pricing; investment decisions relating to other terminals in the airport; policies affecting other partially competing or complementary airports; and government decisions pertaining to the landing rights of foreign carriers. As always, firms will require compensation for this increased element of risk, and they will devote resources to reducing their vulnerability to potentially unfavourable developments.

For the government's part, private involvement adds an additional element of complication to future planning for the airport. Future projects that are potentially inimical to the interests of the private terminal operators, are likely to be a subject of dispute. For example, one might expect the owners of Terminal 3 to oppose a project to facilitate passenger movement between terminals since this would promote inter-terminal competition and somewhat undermine the private owners' market power. Similarly, the extension of rapid transit to the airport might be expected to meet opposition from a private operator that had an interest in maximizing parking revenue.

The costs involved in contending with such risks, along with all the other costs associated with the writing and execution of a complex contractual arrangement,²⁶ could be justified if productive efficiency was substantially higher at private terminals. However, most of the activities within existing federally-owned and operated terminals are currently performed by private sector employees. The privatization of airport terminals does not respond to those problems identified in Section III which underlie the high costs at a number of federal airports.

There are a few potentially offsetting advantages from private involvement. Private developers may exploit new revenue sources - an example being the hotel constructed in conjunction with the private development of Pearson's Terminal 3. But, as we discussed earlier, such development is not dependent on the use of private risk capital for terminal development. Governments can and do seize these opportunities when financial objectives are given priority over other objectives that influence land use decisions. Of greater importance is the apparent ability of private firms to build facilities more quickly.²⁷ Real resource savings are achieved by applying fast-track development procedures in which design engineers and private contractors are selected simultaneously, and the planning, designing, bidding and construction phases overlap. Although there is evidence of governments adopting these procedures,²⁸ public sector contracting rules and approval requirements tend to slow down the construction process.

While the scope for improvements in productive efficiency is limited, allocative efficiency concerns, arising from the potential for the exercise of market power by terminal operators, are likely to increase. Commercial activities at the MFAs have generated a significant profit. Judging by the experience of BAA, one should expect that an unregulated private operator would take further advantage of the opportunities for exploiting a largely captive market. The early experience at Terminal 3 is consistent with these expectations,²⁹ notwithstanding efforts to control some prices.³⁰

Of potentially more concern than the terminal operator's control over retail space is the consequences of his control over the allocation of airline gates. The market power of the terminal operator will be constrained where there are other competing terminals with available capacity at the same airport, or where there is another competing airport that can accommodate new entrants. However, even if gates are available at another terminal, these are unlikely to be perfect substitutes; the private operator will be in a position to exact a premium from airlines that value their ability to service customers from the same terminal as the main carriers with which they interline. A major concern is that, as in the case of retail concessions, the terminal operator will exercise his market power so as to limit market competition. By selectively allocating gates and thereby helping the main tenant carrier(s) to earn higher profits,³¹ the operator can increase the asset value of airline gates along with their rental earning capacity.³² While the government's competition bureau can require fair and equitable gate access, this can be difficult to enforce.³³

Aside from the efficiency implications of private development, there are questions about the distribution of the rents from terminal activities. Table 9 shows that, at MFAs, commercial profits have served to offset the losses on air traffic services. This has been the situation both within individual airports and for the MFA sector as a whole. The existing system of cross-subsidization has not been designed to minimize the welfare losses that must be incurred to achieve revenue self-sufficiency. Nonetheless, to the extent the price of commercial services are marked-up, it is in the public interest that the resulting rents are available to cover losses elsewhere in the system. This issue has surfaced in the popular press. A recent editorial in *The Toronto Star* (9/09/91) states:

If private owners are permitted to skim the cream off money-making Terminals 1 and 2, Ottawa will have less money available to subsidize the chronic money-losers in places like Halifax, Winnipeg or even Montreal.

If terminal development was subject to an efficient competitive tendering process "cream-skimming" would not be a concern. The profits private developers expected to realize (after an appropriate allowance for risk) would be reflected in the payments they were prepared to make to the federal government, and thereby be available to support other parts of the federal airport system. Efficient tendering requires the existence of a number of potential producers with symmetrical information about potential production costs. Given the few corporations that are in a position to finance, develop, and operate a large terminal complex, one might reasonably question the extent to which terminal contracting can conform to an efficient competitive tendering process.

In addition, it is necessary to take account of the higher borrowing costs faced by private firms, as compared to governments. This differential arises from a market failure related to the different treatment of default risks under public and private ownership. The effect, however, is to reduce the government's potential lease revenue from private terminal development. The government faces a financial penalty when it borrows indirectly through a private sector developer, and this will reduce its ability to capture the rents from commercial activities.

In short, major terminals, such as Terminal 3 at LBP, are not simply commercial developments of the sort that are regularly undertaken by private firms. There are public policy concerns arising from the market power of terminal operators. And, there are complexities associated with the interrelationship between the terminal and the rest of the airport. As a consequence, private involvement entails costs which do not exist with most private sector undertakings. These costs may well exceed any gains in productive efficiency from introducing private sector incentives into those few elements of terminal construction and operation that are not already contracted out to private firms.

Table 9

MFAs Financial Performance, 1988/89

Profits* (losses) on:	All MFAs	Toronto	Ottawa	Halifax	Winnipeg	Vancouver	Mirabel	Dorval	Calgary	Edmonton
(\$ thousands)										
Air traffic** services	(61,277)	29,946	(11,844)	(8,841)	(11,650)	(4,112)	(27,495)	(9,564)	(9,962)	(7,755)
Commercial*** services	93,753	49,337	827	2,294	952	17,074	2,323	12,892	5,402	2,652
All Services	32,476	79,283	(11,017)	(6,547)	(10,698)	12,962	(25,172)	(3,328)	(4,560)	(5,103)

Source: Airport Authorities Group.

* Profits are calculated with an allowance for the cost of capital, calculated by applying a 12.5¢ return to the net book value of the airport.

** Air traffic services include airfield activities and terminal activities by airlines and government departments (i.e. inspection, pre-clearance).

*** Commercial services include retail concessions and industrial activities on airport lands.

VI. LOCAL AIRPORT AUTHORITIES

As we noted at the start of the chapter, one of the main thrusts of current federal airport policy involves the transfer of a number of MFAs to local airport authorities. The years of negotiation which followed the initial policy announcement by Transport Minister John Crosbie on April 9, 1987, are now producing their first results. Local authorities (LAAs) in Calgary, Vancouver, Montreal and Edmonton are in the process of assuming overall responsibility for the day-to-day operation and long-term development of their respective airports.

The government has been careful to distinguish its program from "privatization." LAAs are independent entities established under provincial enabling legislation or Part II of the Canada Corporations Act. Unlike private corporations, LAAs do not have shareholders. At the apex of the organization is the Board of Directors with responsibility for establishing objectives and policies, approving plans and budgets, and overseeing the performance of management. The enabling legislation or articles of incorporation specify which governments and organizations may appoint Board members³⁴ and prohibits the nomination of politicians or government employees.

Aside from its continuing responsibility for air navigation, safety and other general regulatory functions, the federal government's relationship to the LAAs is to be that of a landlord. The LAAs are to operate the airport in their own right and to assume full responsibility for any financial liabilities they incur. It is expected that they will achieve financial viability by taking advantage of the freedom to set their own rates and charges and to develop the commercial potential of the airport. The LAA's lease is for a period of 60 years, and it incorporates a rental formula designed to allow the government to share in any growth in gross revenue above some base case forecast. Rental income is expected to leave the federal government at least no worse off financially, and potentially better off, than it would have been had it continued to run the airport. The government will, however, share in the downside risk by accepting lower payments in the event airport revenues are less than those anticipated under continued Transport Canada operation.

The federal government's objectives in creating LAAs are:

- 1) *to allow airports to better serve local community interests;*
- 2) *to enhance regional economic development potential; and*
- 3) *to permit the nation's airport system to operate in a more cost efficient and commercial manner.*³⁵

The discussion in previous sections suggests that there is indeed considerable scope to improve the operating efficiency of Canadian airports. It also points to some particular problems associated with federally-operated airports, thereby supporting the introduction of a more decentralized organizational structure. However, the LAA model raises a number of questions. To start, there is some ambiguity in the proposed role of LAAs. Commercial objectives are not always seen to be consistent with "local community interests" and with "regional economic development" goals. There is a potential for conflict not only between commercial and non-commercial objectives, but

among various non-commercial objectives. How, for example, is the LAA to balance the competing demands of local interests and to distinguish between competing interpretations of what's best for the local community? Secondly, there are questions about the incentives and constraints influencing the management of LAAs. Are these aspects of the institutional structure of LAAs adequate to ensure a high level of organizational performance? Thirdly, there is a need to consider the influence, if any, that the establishment of LAAs will have on the federal government's ability to achieve national objectives for the airport sector.

These three questions all relate to the broader question as to whether the overall environment within which LAAs function is conducive to good performance. This will not be the case if the market for airport services is subject to basic deficiencies to which the federal government is unable to adequately respond. And it will not be the case if there are basic institutional deficiencies arising from the mandate and/or organizational structure of the LAA.

1. Influence on National Objectives

The transfer of airports to LAAs will not affect the federal government's responsibility for air navigation and public safety. The federal government retains the authority it has under the Aeronautics Act to regulate the safety and security of passengers, aircraft and crew at commercial airports. LAAs are subject to guidelines established by the government to control noise at Canadian airports. LAAs must comply with federal regulations to provide access to the disabled, and they must abide by the terms of the Official Languages Act.

The main public policy objective at risk is the federal government's ability to limit the exercise of market power at major Canadian airports. LAAs are free to set their own charges. The general concerns about the monopolistic potential of airports that were discussed earlier are entirely applicable to LAAs. The authorities have an incentive to exploit their market power in so far as this will provide them with the revenue that is needed to support capital programs to expand and modernize their facilities. And the newly created LAAs clearly regard such capital programs as essential to the fulfilment of their commercial and local development objectives.³⁶

The market power of LAAs could be expressed in a number of ways: through increases in landing fees and higher airlines charges for the use of terminal facilities; through the imposition of passenger charges for the use of terminal facilities; through the award of exclusive retail concessions; and, possibly, through restrictions in the availability of gates to new airlines - an action which might well invite intervention by the Competition Bureau. It is not necessarily in the self interest of an LAA to pursue all these opportunities. One might expect that, over time, LAAs will develop a pricing strategy that derives from their market power but is also based on their revenue requirements, the terms of their lease with the federal government, and, perhaps, the expected local reaction to price increases.

By allowing the LAAs to set their own user fees, the federal government does not lose its ability to carry out a program of cross-subsidization within the airport system. The lease revenue it derives from the LAAs can be used to reduce charges at the less intensively used airports. But the federal government loses its flexibility to adjust charges in response to changes in the revenue requirements of the airport system. The government cannot balance the revenue needs of low traffic airports against the impact of higher charges at high traffic airports, as it could under a regime incorporating federal price control.

2. Organization and Control of LAAs

Virtually all organizations, be they public or private, must contend with the problem of ensuring that those who have been delegated authority (the agent) act faithfully on behalf of the party they are to represent (the principal). This problem exists because the interests of agents are not identical to those of principals, and, by virtue of their activities, agents become privy to information that is unknown to principals. The challenge of organizational design is to develop low-cost control mechanisms that will minimize such agency costs.

In the private sector there are a number of internal and external control mechanisms. An especially important source of external control is the equity market, which both provides an evaluation of the implications of managerial decisions, and a facility through which either dissident shareholders of the firm or outside investors can affect a change in the corporation's management and direction. Important internal mechanisms include the oversight provided by the board of directors, and compensation arrangements designed to provide management with a direct interest in the performance of the corporation.

LAAs are not subject to the usual external controls. They are not exposed to the same market-based controls as private firms, and, in particular, are not subject to the important discipline exerted by equity markets. Nor are they subject to public sector controls, such as those that apply to government corporations included in the schedules of the *Financial Administration Act*. Where LAAs require capital funding, outside lenders will have to be satisfied that the authority can generate adequate revenue to meet financing cost. But one might question the extent to which this is a test of the soundness or commercial viability of investment decisions in a situation where the additional revenue requirements can be met by raising charges, imposing new charges,³⁷ or obtaining government assistance. With respect to the latter, it is important to take into account not just the possibility for direct subsidization,³⁸ but also the assistance implicit in the terms of the LAA's lease with the government,³⁹ as well as the (income) tax exempt status of LAAs. Previous discussions suggest that the market power of airports is such that LAAs will indeed have considerable ability to raise charges and impose new charges.

Agreements between the LAAs and the government explicitly exclude the possibility of government loan guarantees. However, it is the federal government (and not local residents) which retains ultimate responsibility for ensuring the operation of an

airport should an LAA fail. Under the circumstances, an LAA may be inclined to take greater risks than a private firm investing prudently on behalf of its owners. Investment decisions may also be adversely affected by the not-for-profit status of LAAs. Since there are no shareholders to satisfy and all profits are for reinvestment, LAAs may be attracted to projects with a relevant low expected social rate of return.

LAAs must hold a public meeting once a year and table their audited financial statements. The problem, here again, is that financial results are not very meaningful indicators of the performance of LAAs. More useful information is likely to emerge from the independent reviews of LAA management, operation, and financial performance that are to be undertaken every 5 years. The results of the review are to be made available to the public "on request." The ambiguity of accountability relationships, however and, in particular, the lack of any process whereby outsiders can remove a board that has performed inadequately, does not encourage public participation. The relationship of the public to LAA directors does not equate to the relationship of voters to government ministers, or the relationship of shareholders to the directors of private sector corporations.

The limited mechanisms for external control take on additional significance in view of the relatively broad mandates of LAAs. For example, enabling legislation in Alberta states that the purposes of an authority are:

- a) *to manage and operate the airports for which it is responsible in a safe, secure and efficient manner, and*
- b) *to advance economic and community development by means that include promoting and encouraging improved airline and transportation service and an expanded aviation industry.*

LAAs are not simply commercial entities. Non-elected individuals will have considerable discretion in deciding how the revenue generated from public assets is to be allocated to achieve public policy objectives. The concerns that naturally arise from this vesting of public functions in non-governmental institutions would be reduced if LAAs were subject to direction from ministers who are directly accountable to the public; or if LAA objectives were to be arrived at through a process of public consultation that itself had a high degree of public support and credibility. Neither of these features is incorporated in the current approach.

While internal controls cannot allay concerns about the discretionary power of LAA boards and their relative lack of accountability, an effective internal system of performance monitoring can at least provide some assurance that serious efforts are being made to achieve those objectives set by the board. An effective system of internal controls requires: outside directors with an incentive to undertake the required oversight of management;⁴⁰ clear corporate objectives; and an internal monitoring system that can provide the information that is required to assess performance in relation to objectives. There is reason to be concerned about the ability of LAAs to meet these requirements. In particular, the ambiguity that has characterized discussions about the role of LAAs, and

that is incorporated in statements of their mandate, will make it difficult to formulate precise operational objectives. Moreover, insofar as there has been consideration of reporting requirements, the focus has been on financial measures of performance which, as noted, are unable to provide a reliable indication of overall performance or of the wisdom of particular management decisions.

Notwithstanding the inadequacies of the LAA model, it does address the problems identified in Section III that are a feature of federal airport operation in Canada. Moreover, in financial terms, the government is likely to be better off as a landlord with a revenue-sharing lease, than as an operator guided by traditional federal management practices. In weighing LAAs against the status quo, the relevant considerations are, arguably, quite finely balanced. However, we would argue that the LAA model should be compared not with what exists, but what could be achieved through alternative attempts to improve the organizational structure of federal airports.

In designing the current policy, the federal government has drawn on U.S. experience with Airport Authorities.⁴¹ However, U.S. Authorities have been subject to the important discipline provided by major carriers who have assumed most of the operating risk at these airports. For all the disadvantages of residual cost financing in a deregulated environment, it has had the benefit of injecting a much needed form of external control on airport activities. U.S. airlines, who have committed themselves to paying any cost not covered by other airport users⁴² and to ensuring the solvency of the airport, have of necessity become involved in overseeing the efficiency of airport operations and the commercial viability of proposed investments. The majority-in-interest clause, which is a feature of the long-term use agreements at most residual cost airports, contractually binds the airport owner to obtain airline approval for any major capital investment. Therefore, in applying U.S. experience to Canada, it is necessary to consider how that experience has been influenced by the specific airport financing arrangements that developed during the period of airline regulation.

It is also useful to consider some of the concerns that have begun to emerge in the U.S. about the public authority model more generally. Since the Tennessee Valley Authority was established in the 1930s, public authorities have proliferated in the U.S. There are presently estimated to be 6000 public authorities at the federal, state and local level, with these involved in a variety of areas, including airports, highways, transit, housing and waterfront development. The public authority model was originally developed in reaction to the "spoils system" which resulted in unqualified, if not dishonest, appointees heading U.S. government agencies. The intention was to establish institutions that are insulated from political pressures and can promote independent decision making by well-trained professionals; the predominant value has been described as "neutral competence." As Doig and Mitchell (1991) note, there is an inherent tension between "neutral competence" and democratic values emphasizing "responsible executive leadership." In addition, the performance of U.S. public authorities has often fallen short of expectations. Doig and Mitchell summarize a number of the criticisms of U.S. public authorities in recent literature:

Some criticisms have centred on the increasing trend toward providing tax subsidies to authorities whose operations are supposed to be self-financing. Also, governing boards are faulted for failing to exercise control over their agencies - and for allowing policies to be "generated within the bureaucracy of the agency and to be sold to the commissioners by the administrative head". The executive staff is sometimes accused of ignoring community needs in the quest for budget surpluses and capital expansion. Some authorities have been charged with awarding contracts based on political connections rather than merit. And overall, the proliferation of self-managed authorities - sometimes dozens in a small geographic area - is blamed for the incoherence and inconsistency of state and local priorities and program activities.

3. Conclusion

The federal government is transferring its authority for a number of major airports to an organization which falls into that middle ground where it is subject neither to the pressures of the market nor to the controls of the public sector. While there are benefits from reducing the overhead costs and the administrative inefficiencies associated with federal operation, there are other ways to achieve the required decentralization than by the establishment of LAAs. The new authorities will have considerable capacity to generate revenue. The governance structure of LAAs provides no assurance that this revenue will be directed to projects that are either commercially sound or consistent with the broader public interest.

VII. CONCLUSION

In airports, as in roads, there are policy objectives that are exceedingly difficult to achieve through an arrangement with a private sector firm. Problems of contract negotiation and enforcement apply particularly to two objectives: the desire to support segments of the airport system that are not commercially viable, and the need to limit the potential for the exercise of monopoly power. In addressing the latter objective, regulation of a private firm provides a viable alternative to public ownership. This is less clearly so in roads, because of the potential problems in appending a tolled route to a system of untolled roads, and because of the nature of public policy objectives and the resulting reluctance of governments to delegate decision making. The latter consideration does not carry the same force in airports.

The limited information available does not suggest that ownership per se is an important determinant of efficiency. The inefficiencies that have been identified at Canadian airports, reflect more upon the existing system of federal operation than upon public ownership. While centralized control can facilitate investment co-ordination, which is important when there is a need to irretrievably commit large amounts of capital, there are other ways to achieve co-ordination. Therefore, while privatization is one potential

response to concerns about the performance of Canadian airport, another response is to introduce major institutional reform within the public sector.

Over the years, the federal government has tried a variety of institutional arrangements. The use of private firms to operate some smaller federal airports has been quite successful, although this is not a promising approach for larger facilities. The decision to allow private developers construct and operate major airport terminals, is much more questionable. Major contracting problems arise - not unlike those that would arise with the privatization of an airport as a whole - while the scope for efficiency gains is limited. The decision to transfer federal airports to local airport authorities also raises some troubling issues. LAAs are not fully subject to market pressures or to the usual public sector controls. Those mechanisms that have been established are unlikely to impose adequate discipline on the directors and manager of LAAs.

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ENDNOTES

1. A New Policy - A Future Framework for the Management of Airports in Canada, April 8, 1987.
2. The Transport Canada Airports Authority Model - A Public Enterprise Defined, February 1988.
3. Report of the Auditor General of Canada to the House of Commons, Fiscal Year Ended 31 March 1990, pages 719 and 720.
4. Economies of scale were identified in the earlier studies of U.K. airports by Doganis and Thompson (1973) and Doganis, Pearson and Thompson (1978).
5. This is more fully discussed in Gillen and Oum (1992).
6. Estimates suggest that a one percent increase in general taxes results in welfare losses equal to about one-fifth of the extra revenues raised. See Dodgson and Topham (1987).
7. The latter has been illustrated by the Auditor General. In his 1986 Report, the Auditor General observed that "both at Calgary and Mirabel, most concessions are located on a separate floor in the terminal building, away from the regular flow of passenger traffic, reducing the opportunities for increased revenues through impulse buying" (paragraph 13.65). In his 1990 report, the Auditor General commented on "the unresponsive nature of the rate and fee setting process in parking, ground transportation and land development" (para. 30.41).
8. "Airport shopkeepers demand big rent cuts", The Globe and Mail, July 24, 1991.
9. Caviar House, one of the 19 retailers at Terminal 3, is reported to have lodged a lawsuit, contending that Huang and Danezkay violated the terms of a lease which provided it with exclusive rights for the sale of caviar, smoked salmon and other prepackaged gourmet foods at the terminal.
10. Borins (1982) and Gillen and Oum (1992).
11. The study by Starkie and Thompson (1985) undertaken before BAA was privatized remains relevant because the pricing regime has not changed.
12. For example, BAA has opposed the construction of an additional London runway, which is necessary according to the Civil Aviation Authority. However, BAA has bought a private property developer and is developing a major hotel at Heathrow Airport.
13. They are also partially attributable to international agreements which preclude full peak-load pricing.
14. From Hamilton (1991).
15. The alternative to an exclusive-use lease is a preferential-use lease which gives the lessee the first right to use the facilities. The airport operator may allow another airline to use preferentially leased facilities during unscheduled periods. Exclusive-use leases may be limited by recapture provisions under which an airline can be forced to forfeit or share facilities it does not use.
16. The problem is most serious at the busiest U.S. airports. Jordan (1991) reports on a 1989 survey by the Airport Operators Council International which found that at the 30 busiest U.S. airports, only 51 of 2,495 gates, or 2.0 percent, would be immediately available during peak hours. These numbers refer to gates available from the airports themselves. In addition, gates can be subleased from carriers, although often at a high cost. The GAO (1990) refers to a claim by Southwest

officials that they pay 12 to 18 times as much for subleased facilities as that airline pays the airport authority. Use of another airline's employees in a handling agreement was reported to cost about 6 times as much as what the airline would pay using its own employees.

17. However, residual financing has provided some benefits. Carrier oversight of airport activities is desirable if airport managers are subject to few other disciplinary mechanisms. We expand on this point in Section VI.
18. Quality of service is extremely difficult to measure. Changes in the mix of output can be taken into account by measuring each of the services the airport produces and combining these into an aggregate measure through the use of appropriate weights. Such weighting has not been undertaken for the productivity measures in Figure 2.
19. For example, at the federally operated airport in London, it has been estimated that one quarter of the airport's 544 hectares could be transformed into development land for commercial and industrial uses. There is already a golf course on airport land. The airport is seeking proposals from private developers who would lease airport land for other uses.
20. If unit costs are higher because an airport decides to undertake an activity itself rather than to contract out, this is a form of inefficiency. Ideally, adjustments should be made only for activities that are the result of decisions beyond the control of airport management.
21. There are a few areas where enforcement is likely to be difficult. Hickling (1990) identifies the 'sealing of runway cracks' as one task where simple inspection is unable to reveal whether the contractor has adequately met his obligations. Problems from inadequate repair do not show up for years and can entail very large costs. While this possibility is reduced where contractors place a high value on their long-term reputation, this task is one which may call for some close degree of monitoring if it is to be contracted out.
22. This is discussed in Section IV.
23. Sypher:Mueller (1991) compares federally-operated airports with other federally subsidized airports and finds that, adjusted for traffic, costs of supporting the federally-operated airports are significantly higher. This same conclusion applies if we restrict the comparison to the sub-set of federally supported airports that are operated under contract. This cost comparison does not attempt to adjust for factors besides scale which could account for differences in operating costs.
24. Resolute Bay doesn't handle any scheduled flights, while over the past year enplanements and deplanements at Kenora totalled just over 26,000.
25. The reference here is to what Williamson (1975) refers to as "first mover advantages."
26. Transactions costs include the costs of the lobbying that is undertaken on behalf of competing contractors. The firm that won the contract to develop Terminal 3 reportedly employed four different "government relations consultants."
27. For example, Terminal 3 was completed in 3 years, which is less time than the government has taken to complete major renovation projects at smaller airports in Ottawa and Calgary. A spokesman for the private developer, Huang and Danczkay, explains: "As they build the structure, they're doing the drawings for the interiors - so you're building and designing at the same time. You can only do that if you have an army of engineers and architects." (Financial Times, 17/12/90).

28. Gomez-Ibanez et al (1990) note that many states use design-build procedures to speed the construction of prisons.
29. Some of this evidence was cited in Section 2. Concerns about the cost of operating at Terminal 3 have also been voiced by: a car rental company that complains that it is paying more than five times the rent it pays at the other two terminals; the operators of hotel shuttle services who now must levy a fee of up to \$5 to cover their permits; and airport taxis and limousines who had to digest a steep boost in license fees to cover the costs the federal government incurred to "buy back" its licensing authority at Terminal 3 from the private developers.
30. For example, food and beverage retailers are not allowed to charge in excess of 15 percent above what they charge at their other outlets in Toronto.
31. In the U.S. studies by Borenstein (1989) and Morrison and Winston (1989) show that fares are significantly higher on routes with little or no competition. The owner of one terminal in an airport with 2 or more terminals cannot control market competition, but he may be in a position to provide a significant advantage to one of the carriers in a market by affording its passengers more convenient terminal interconnections.
32. Currently there is excess capacity at Terminal 3. Since rents are pro-rated among the carriers, Canadian Airlines would benefit from the addition of new tenants. However, this does not mean CAI is indifferent to the carriers with whom it shares Terminal 3. It has been estimated that, by finding suitable new tenants, CAI could reduce its rental charges by about \$15 million a year, and earn another \$5 million by undertaking ground handling for the new carriers.
33. Equitable access depends not simply on gates being made available to competing carriers. It depends on the time period in which access is provided, the location of the gates which are being made available, and the price and other terms of access. Problems may arise especially where gates are being subleased from tenant carriers. Equity also requires that the new carrier is not disadvantaged through high handling fees or excessive charges in other areas.
34. For example, VIA's Board members are to be nominated by: the cities of Vancouver and Richmond, the Greater Vancouver Regional District, The Board of Trade, the law society, the Chartered Accountants' Institute and the Professional Engineering Society.
35. A future framework for the Management of Airports in Canada, April 1987.
36. For example, a recent newspaper story based on interviews with the presidents of the LAAs refers to: "a major capital program...that could take 5 to 10 years" at Edmonton; "plans to spend \$600 million over the next 20 years" at Aéroports de Montréal; and plans "to link development to other business initiatives in the city, probably in technology and transportation," at Calgary. (Globe and Mail, October 2, 1991).
37. Passenger Facility Charges (PFCs), which only exist at a few airports in Canada, are expected to be an important revenue source for LAAs.
38. While the federal government does not intend to subsidize LAAs, regional and local governments, who view the authorities as vehicles to promote local development, are likely to react more favourably to appeals for support.
39. The base component of the LAAs' lease payments are based on the government's net revenue projections, and include a deduction for both operating costs and the funding costs of intended government investments. With funding costs being deducted from rental payments, the

government is in effect financing LAA investment up to the level of intended government capital spending.

40. As Fama and Jensen (1983) discuss, outside directors have an incentive to effectively fulfil their oversight function to help develop their reputation as experts in decision control. This, in turn, will enhance the value of their human capital as internal decision makers in other corporations. In nonprofit organizations, directors are generally large donors who have a particular interest in seeing that funds are wisely spent.
41. According to a study by the Congressional Budget Office (1984), airport authorities accounted for 13 per cent of large, and 26 per cent of medium-sized airports in the U.S. in 1983. Port authorities, which operate a variety of different facilities (airports, harbours, bridges, toll roads) operated 21 per cent of large and 13 per cent of medium-sized airports. Most commercial airports in the U.S. - i.e. over 50 per cent of large and medium-sized airports - are run by municipal or county governments.
42. At some residual cost airports, the landing fee depends on the revenue shortfall from airline terminal rentals and all non-airline revenue sources. At other airports, the landing fee is the budget-balancing item for the airfield cost centre only.

CHAPTER 4 - TOWARDS AN IMPROVED INSTITUTIONAL FRAMEWORK

The discussion in previous chapters indicated the characteristics of an efficient regime of road and airport administration. Prices would be set to reflect the marginal social costs of infrastructure use, taking account of important externalities associated with congestion and environmental damage to the extent practicable. Where it was necessary to raise prices above marginal social costs to meet revenue requirements, this would be done so as to minimize the resulting welfare loss. Investment alternatives would be assessed in terms of their relative net social benefit, given economically correct infrastructure user charges. Social costs and benefits would be used not only to distinguish between projects, but also to determine investment timing and to set limits on the amount of new infrastructure investment. Inputs would be chosen and production processes organized so as to minimize the cost of operation. Those services that can be most efficiently performed by specialists not involved in infrastructure provision would be purchased under contract.

The challenge is to establish a framework of incentives that will encourage this behaviour in an environment in which: markets are highly imperfect and cannot be relied upon to guide production and investment decisions or to generate the pressures needed for efficient performance; and, there exists other objectives besides economic efficiency. These factors provide a rationale for government intervention in both roads and airports. What must be determined is, first, whether such intervention should be carried out through public provision of infrastructure or through a contractual arrangement with a private firm; and, secondly, what mechanisms can be introduced to reduce agency problems and increase the incentives for efficient performance by either the public or private infrastructure provider.

Previous chapters devoted particular attention to the first of these questions. In the case of roads, private provision is not a promising option. Under the existing system of public financing, it will be difficult to identify new intercity road links that could generate sufficient toll revenue to provide private investors with a reasonable rate of return. Moreover, what evidence is available does not suggest that private road provision is likely to result in significant gains in allocative or productive efficiency. Public road provision satisfies the government's need for a high degree of flexibility in specifying policy objectives with respect to new road investment. At the same time, governments can realize efficiency gains that are available from competitive tendering by contracting out road construction and maintenance.

The need for major institutional reform, which could include changes in ownership, is much greater with airports. Federal airports have been burdened with high government overhead costs; labour contracts that greatly limit management's operating flexibility; and, in some cases, the need to maintain facilities in excess of requirements. These sources of added cost are more directly linked to federal operation than to public ownership per se. However, the concern that airports would become a vehicle for pursuit of new and costly public policy objectives would, to some extent, remain under alternative

forms of public ownership. Moreover, in airports, unlike roads, public ownership is not necessary because of the difficulty of defining public policy objectives and delegating decision making. Indeed, it is apparent that the federal government is quite prepared to delegate airport pricing and investment decisions, relying, particularly in the latter case, on the general control that is available through the federal environmental assessment and review process.

These findings suggest some general directions for reform. In roads, the major payoff is likely to come not from the creation of opportunities for private sector risk taking, but from institutional changes that will increase the pressure on policy makers to adhere to the principles of efficient pricing and investment. In airports, there are gains to be realized from greater decentralization of operations. This could, but need not necessarily, involve a shift from public to private ownership. What is essential is that local airport operators are subject to an adequate disciplinary framework. Based on these general conclusions, we offer some proposals for institutional reform in roads and airports.

Roads

In roads, the appropriate focus is on mechanisms that will increase the ability of legislative bodies and the public to assess governments' activities as custodians of the nation's road infrastructure. Currently, road users lack the information to determine whether this important asset is being efficiently managed. Accountability suffers from an absence of objective and systematic information on the condition of the capital stock; on the social costs and benefits of investment alternatives; on the operating performance of road departments; and on the extent to which users in general, as well as individual classes of users, are paying their way.

An independent road advisory could help fill these information gaps and make policy making on roads more transparent. In particular, the agency could examine the changes in provincial fuel taxes, licence fees and other changes that are required to bring about a more efficient road pricing system. It could review the social costs and benefits of alternative road projects that are under consideration. It could assemble relevant financial and physical measures, and develop meaningful indicators of operating performance, all of which could be made publicly available through something akin to a periodic "state of the roads" report.

In 1989, New Zealand established an independent road agency to coordinate road planning and provide independent advice on road revenues and expenditures. The agency, Transit New Zealand, develops an annual National Land Transport Program, which, after approval by the Minister of Transport, becomes the basis for road charges and expenditures. Transit New Zealand also manages the Land Transport Fund and publishes the accounts to provide all participants with information on road-related revenue and expenditure flows. The National Land Transport Program is developed on the basis of planning decisions made at the regional and local level and involving extensive consultation.

The role of New Zealand's road agency is to work out the application of principles to which the government has already committed itself. In other situations, the agency would need to focus its efforts on gaining recognition and support for economically sound pricing and investment principles. The latter is more relevant to the current Canadian context. In either situation, however, an independent agency can contribute, in an important way, to making policy makers more accountable for their decisions affecting road networks.

Airports

There are a number of alternative options that could satisfy the need to free federal airports from the constraints associated with existing ownership and operational arrangements. The administration of federal airports could be situated at arm's length from government by transforming the AAG into a Crown corporation similar to the Australian Federal Airports Corporation. At the opposite extreme, the government could privatize its holdings, thereby terminating its role as an airport owner and operator. The latter provides a more complete response to concerns about federal operation; in particular, it eliminates the concern that airports will be used to address policy objectives that are better pursued through alternative means. But so long as importance is attached to the policy objectives discussed earlier - namely, to ensure that existing facilities are maintained as airports, and to control the exercise of market power by airport operators - the government will necessarily be involved in the difficulties associated with the negotiation and enforcement of a long-term contractual arrangement. These will, in some cases, make privatization inadvisable.

If market forces are allowed to operate, it is likely that a significant proportion of current airports would not survive as operating entities over the longer term. In some cases, the low sale price required to attract private investors may provide an immediate signal that airport resources, and particularly airport lands, are more profitably directed towards alternate uses. In other cases, pressures to reallocate resources will emerge over time - due, for example, to unexpected declines in traffic or, perhaps, to the appreciation of surrounding land values. While such pressures are desirable from the perspective of allocative efficiency, it is conceivable that governments will continue to regard them as contrary to the broader public interest. As a consequence, if airports are privatized, the government could find itself in a difficult position where it must "bribe" private investors to continue operating a given facility. Indeed, even the suggestion that there is a commitment to maintaining a given airport network leaves the government highly vulnerable to opportunism by private airport owners.

As we have seen, in such situations regulation can serve as an appropriate mechanism to administer the contractual arrangement between the government and the private firm. A regulatory regime can reduce the risk of opportunism, while providing the flexibility needed to adapt an agreement to changing economic circumstances. It would be very costly to subject all airports currently owned by the federal government to the regulatory process. Regulation could reasonably be applied to the largest airports, including the "major" airports and some second tier facilities (in terms of traffic volume)

where the scope for monopoly profits justifies continuing regulatory oversight. These airports are the most promising candidates for privatization.

For other airports, public ownership is likely to be preferable. This could involve transferring the airport to a local government or establishing a separate federal or provincial airport corporation to administer the facility. Under any of these arrangements the airport would be accountable to elected representatives of the owners (unlike the situation with an LAA). These alternatives would also avoid the constraints and the pressures for high minimal service standards that have been troubling features of Canada's federal airport system. While opportunism may still be exercised in the relations between different levels of government, the risks for the federal government are much lower when the other party is another level of government that has a similar interest in sustaining the operations of a given airport, than when it is a private owner. While price regulation would generally not be warranted, it would be desirable to retain the regulatory option for those situations where governments believe there may be significant benefits from the involvement of a third party in monitoring and control.

Additional complications arise in relation to the most heavily subsidized airports which could not be sold or transferred as airports without some commitment by the federal government to provide continuing financial support. As discussed previously, the federal government is highly vulnerable to opportunism under such circumstances. These risks, which are due to the difficulty of writing and enforcing an agreement that incorporates adequate incentives for efficient performance, would exist even if the arrangement is with another level of government rather than a private firm. Hence, it will generally be desirable to retain federal ownership in these circumstances.

Federal government ownership needn't involve federal operation. Indeed, as we saw in Chapter 3, performance tends to be higher at small airports that are operated by private firms under contract than at federally-operated airports. A successful contracting system depends on the existence of effective competition in the provision of airport management services. If necessary, the federal government could establish its own management firms to generate competition.¹ Responsibility for all of the small federal airports in a given region could be given to a regional public corporation which would handle the contracting out of airport operations, and look after planning and related head office functions.

In a highly decentralized system, there is also a need for some mechanism to eliminate the costs of uncoordinated investment activities. While the federal environmental review process requires that airport projects are assessed against alternative options, it is not intended to serve as a vehicle of investment planning and coordination. To ensure that investment is coordinated, this task is best assigned to specialized planning commissions which would be given authority to review all proposed airport expansion in designated regions. The review process would attempt to identify which of the competing projects in a region have the greatest expected benefits. In south-central Ontario, for example, an airport planning commission could be charged with coordinating investment at Pearson, Toronto Island, Oshawa, Hamilton, Buttonville, Downsview, Brampton, Markham, Burlington and Waterloo-Wellington.

The general approach that is being proposed is compatible with alternative financing arrangements. A system of cross-subsidization could be maintained by placing the revenue from the privatized airports into a special fund which is earmarked for the financing of those revenue-dependent airports that remain under federal ownership. Airport privatization, however, should be aimed at maximizing overall social benefits, not at maximizing the revenue the government derives to finance its subsidization program. While we believe that privatization should be accompanied by the imposition of regulatory control, proceeds from the sale of federal airports will be lower as a result.

The appropriate institutional arrangements greatly depend on government policy objectives. The approach that has been outlined assumes that the federal government is committed to maintaining the existing airport system (although not necessarily existing levels of airport service). If this is not the case, there is a greater role for private airports operating subject to the influence of market forces. There would remain a need, however, for the government to introduce corrections for certain significant market deficiencies. This has also been recognized in the U.K. The controls proposed above - to apply economic regulation to airports above a certain size, and to subject proposed airport developments to planning control - are features of current airport policy in the U.K.

Conclusion

It is useful to review the answers that have been reached to the questions posed at the end of Chapter 1. First, there are legitimate reasons for government intervention in the provision of road and airport services. Left to their own, market forces would not provide a solution that is efficient or that is likely to be socially acceptable. The potential for monopoly abuse is a particular concern in both roads and airports. Secondly, there are gains to be realized from contracting out certain functions, including the overall operation of some smaller airports, but short-term contracting is a supplement rather than an alternative to other forms of intervention; the government cannot address its main policy objectives through competitive tendering. Thirdly, while regulation is a feasible alternative to public ownership in airports, this is less so in roads where there is a greater need for policy-making flexibility and where the addition of a private tolled route to a publicly-financed road system introduces special complications. Fourthly, the available evidence does not suggest that, in general, infrastructure is likely to be provided more efficiently by regulated private firms than by governments or their agencies. However, there have been some significant additional costs associated with federal airport operation in Canada. Privatization is an option which has appeal for some components of the federal airport sector.

Finally, the experience of Canada and other countries does not point to any innovative new institutional form that holds the promise of lower agency costs. The Local Airport Authority, which is a variation on a well-established U.S. model of governance, raises some troubling accountability issues. Experience does indicate, however, that there are better and worse forms of regulation and of public provision. Public infrastructure agencies are under pressure to perform where responsibilities are clearly

specified, performance is closely monitored, and the board and management are effectively held to account for performance results. Policy makers are under pressure to perform when they must answer to an electorate that has been provided with the information that is required to make a reasonable assessment about government decisions. Reforms in these latter areas are likely to hold the greatest promise for improving the efficiency of infrastructure provision.

ENDNOTES

1. U.S. experience under OMB Circular A-76 is instructive in this regard. Government agencies compete against private firms and are reputed to be successful in retaining production in-house in about 40% of the competitions.

